VOL. LXXXI PART THREE

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

MARCH 1956

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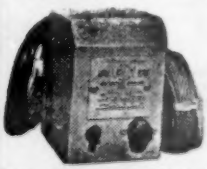

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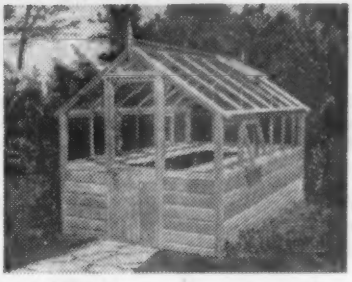

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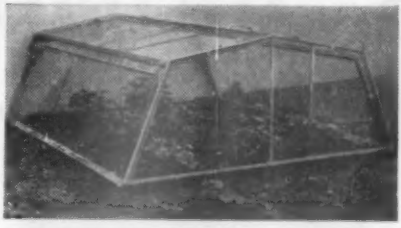

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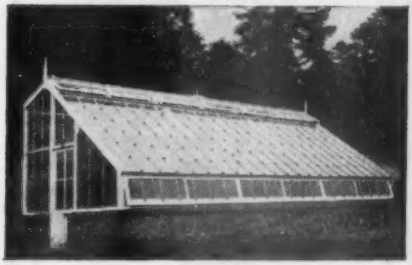

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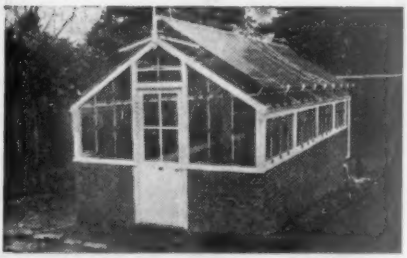

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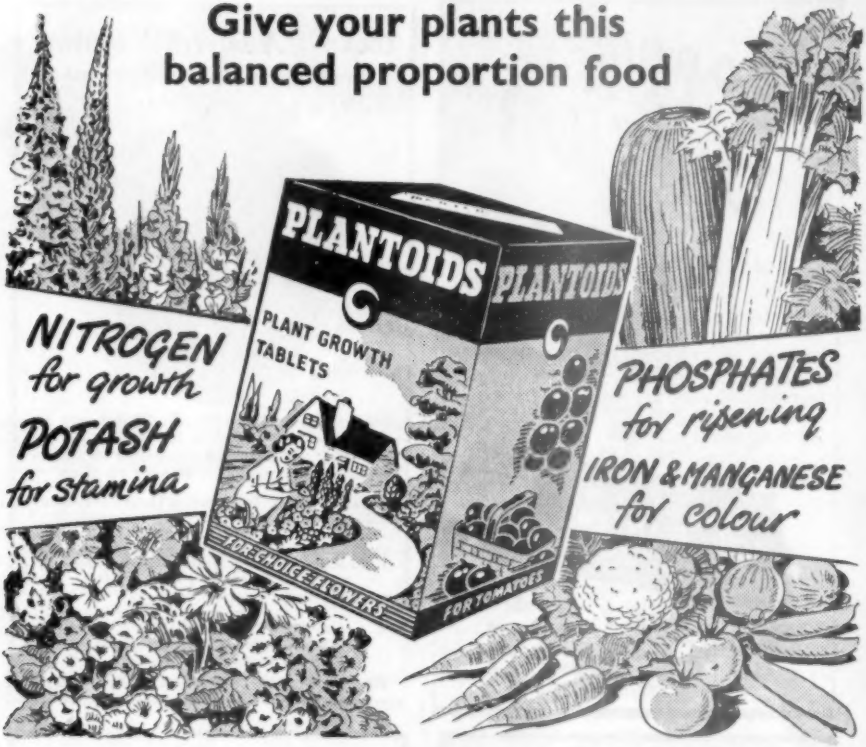

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

VOL. LXXXI PART THREE

March 1956

THE SECRETARY'S PAGE

ANNOUNCEMENTS—MARCH AND APRIL

Shows

TUESDAY, March 13 12 NOON to 6 P.M.	Fortnightly Flower Show. British Orchid Growers' Association's Show.
WEDNESDAY, March 14 10 A.M. to 5 P.M.	
TUESDAY, March 27 12 NOON to 6 P.M.	Fortnightly Flower Show. Daffodil Competition.
WEDNESDAY, March 28 10 A.M. to 5 P.M.	Alpine Garden Society's Show.
TUESDAY, April 17 12.30 P.M. to 6 P.M.	Fortnightly Flower Show. Daffodil Show. Camellia Competition.
WEDNESDAY, April 18 10 A.M. to 5 P.M.	Sewell Medal Alpine-house and Rock-garden Plant Competition for Horticultural Traders.

Lectures

TUESDAY, March 13, at 3 P.M. "Double Primroses," by MAJOR H. C. H. TAYLOR, O.B.E.

TUESDAY, March 27, at 3 P.M. Masters Memorial Lecture, "The Improvement of Strains of Vegetables," Part I, by MONSIEUR R. L. DE VILMORIN, D. ès SC.

TUESDAY, April 17, at 3 P.M. Masters Memorial Lecture, "The Improvement of Strains of Vegetables," Part II, by MONSIEUR R. L. DE VILMORIN, D. ès SC.

Demonstrations at Wisley—The following demonstrations will be given at Wisley, that on the second day being in each case a repetition of that given on the first.

Flower Garden

February 29–March 1. The Pruning of Roses. (Commencing at 2 P.M.)

March 7–8. Seed Sowing and Vegetative Propagation of Alpines. (Commencing at 2 P.M.)

Fruit Garden

March 14–15. Pests and Diseases of Fruit Trees; Recognition and Methods of Control. (Commencing at 2 P.M.)

The Restaurant at Wisley—The Restaurant in the Gardens will be open at the following times during 1956:

March 28 to October 14 (excluding Good Friday)

Weekdays: 10.30 A.M. to 6 P.M. (or sunset, whichever is the earlier).
Sundays: 2 P.M. to 5.30 P.M. (to last Sunday in September).
2 P.M. to 4.30 P.M. (Sundays, October 7 and 14).

The restaurant will provide a cafeteria service of cold lunches, sandwiches, cakes, tea, coffee and other light refreshments. There will also be a waitress service for hot lunches. Reservations by parties for lunches or teas may only be made on days other than Saturdays or Sundays; organizers should make arrangements, not with the Society, but direct with the caterer, MRS. D. BADCOCK, at Oak Cottage, Shere, nr. Godalming, Surrey (*Tel.* Shere 168). Application has been made for a licence for the service of alcoholic refreshments with meals.

Picnicking is not allowed in the Gardens.

Camellia Competition—The annual Camellia Competition will be held in conjunction with the Fortnightly Show on April 17 and 18. The Schedule, which may be obtained on application to the Secretary, is similar to that for last year's Competition but attention is drawn to the following changes:

The value of the prizes in Class 74, which calls for six sprays, has been raised.

The maximum height of the plants called for in Classes 81 and 82 has been raised from 36 inches to 48 inches.

A silver trophy, provided from a fund established by MR. RALPH S. PEER, is offered for award for the most meritorious exhibit in the competitive classes.

Rhododendron Show—The annual Rhododendron Show will be held in conjunction with the Fortnightly Show on May 1 and 2. The Schedule, which may be obtained on application to the Secretary, contains three new Classes, viz.:

The Lionel de Rothschild Challenge Cup Class, which is open to all and calls for a group of plants and/or cut blooms; and Classes 3 and 63, which call for three species and three hybrids respectively, and are open

only to those who have not won a prize in similar or more difficult classes during the last five years.

Lily Group Meeting—The Lily Group will hold its first meeting of the year in the Restaurant of the Old Hall at 4 P.M. on Tuesday, April 17, when there will be a Discussion on The Raising of Lilies from Seed.

Preliminary Examination for the National Diploma in Horticulture—This examination is an educational test to be taken by those candidates for the Intermediate Examination for the National Diploma in Horticulture who are unable to produce documentary evidence of the sufficiency of their general education.

At the examination held on December 3, 1955, there were one hundred and seventeen candidates, of whom thirty-one satisfied the Examiners and will be eligible for entry to the N.D.H. Intermediate Examination if or when they have had the requisite period of practical experience in horticulture.

Botanical Magazine Index—This Index is now ready. The cost of the copies bound in blue buckram as announced in the February JOURNAL will be £2 8*s*., postage and packing 2*s*. extra.

Rhododendron and Camellia Year Book, 1956—This volume is now published and contains a number of features of interest to growers of both genera. Price 10*s*. Postage and packing 1*s*. U.S.A. $1.70, post free.

Pamphlet. The Amateur's Shrub Garden. By A. OSBORN. A revised edition of this pamphlet has now been published and some notes on air layering and the use of hormones in propagation have been added by MR. F. P. KNIGHT, Director of the R.H.S. Gardens, Wisley. Obtainable from The Secretary. Price: 1*s*., plus 3*d*. postage.

Floralies Internationales, Nantes—This Show is being held in Nantes from April 28 to May 8, 1956. All enquiries should be addressed to Floralies Internationales, Jardin des Plantes, Nantes, France.

NOTES FROM WISLEY

J. B. Paton

CONTINUING the observations made in the last two notes on plants suitable for cultivation under glass, we turn this month to the Alpine House. In February 1953, we discussed the general features and purposes of this type of house, but it may be of interest to state once again that the main purpose of this unheated house is to provide shelter to the early-flowering alpines and thus to protect them from the inclemency of the weather and to bring them nearer to eye level than is possible in either the rock garden or the frame. As Fellows who have visited the Gardens will have realized, there are combined with the

Alpine House a large number of frames where the plants, in their pots or pans, spend the majority of the year, only being removed to the Alpine House as they come into flower.

One of the finest sights in early spring is produced by the mass of flowers on the many plants of the saxifrages. The genus *Saxifraga* consists of some 300 species mostly perennial herbs, usually of alpine origin. For convenience of classification the genus has been divided into sixteen sections of which we are primarily concerned with the sections Kabschia and Engleria. By some authorities Engleria is treated as a subsection of Kabschia. From the section Kabschia come the most beautiful saxifrages and the main feature of this section is the formation of a densely-tufted cushion from which arise either solitary flowers or flowers carried on a branched stem. The leaves may be either spiny or broader with a blunt or round-pointed tip. Propagation is by small cuttings taken after flowering, and inserted under a bell jar.

Of the many varieties and interspecific hybrids to be seen during March and the early part of April some of the finest are those derived from *S. burseriana*. This species comes from the Dolomites where it inhabits banks of limy silt. Among the best known of its forms are 'Gloria' and 'Major'; the former has very large white flowers carried on red stems 4 inches long and the latter, also known as 'magna,' has large white flowers on green stems. Other forms of *S. burseriana* include the white, pink-flushed 'His Majesty,' the very compact, white-flowered 'crenata' and the larger, soft yellow 'sulphurea.' There are various hybrids between *burseriana* and other species of this section; in fact, the greatest proportion of saxifrages in cultivation are either hybrids or forms which have superseded the parent species. A hybrid with *S. marginata* as the other parent is × *suendermannii purpurea* introduced into cultivation in 1920 under the name × *hedewigii*. It more nearly resembles *burseriana* than its other parent and it has a slightly laxer tuft, slightly larger leaf and two or three rich rose flowers on a 2-inch-high stem. *S.* × *ochroleuca* is a cross between *sancta* and *burseriana* and has somewhat starry, pale yellow flowers carried on 2-inch high stems. It was raised by SÜNDERMANN as was the brilliant white-flowered × *petraschii*. Two closely related plants are *S.* × *irvingii* and *S.* × *jenkinsae*. Raised at Kew, *irvingii* has pale lilac-pink blossoms and its near ally is of similar colour, but with larger flowers and leaves. Perhaps the best yellow is 'Faldonside' with 3–4-inch high stems arising from dense silver-grey tufts. Also yellow is the starry-flowered × *haagii*. Of the deep pink and rose-coloured hybrids there are 'Cranbourne' with rose-coloured flowers carried over small dome-shaped rosettes and the soft red × *clarkei* with neat silvery tufts. This hybrid was raised by SÜNDERMANN by crossing the Pyrenean *media* with *vandellii* from the Alps of Lombardy. Also a member of the Saxifragaceae *Ribes laurifolium* is very useful because of its long season of flowering in the early part of the year. It has 6 to 12 greenish-yellow tubular flowers carried in pendent racemes. This completely hardy native of China is only

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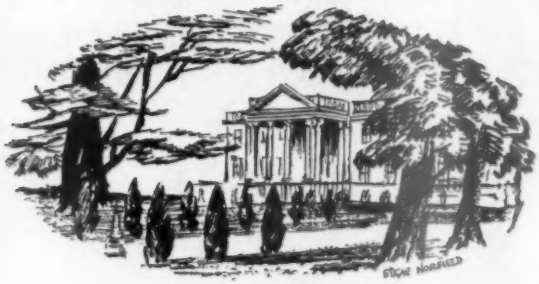

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accommodated in the Alpine House in order that its blooms may not be damaged by frost.

Also with a long season of blooming is *Ranunculus calandrinioides*, a fleshy-rooted perennial from Morocco, which produces, on a stem 4 inches high, flowers made up of white, pink-flushed petals and conspicuous yellow anthers. The grey-green lanceolate leaves appearing in the late autumn are also quite attractive.

The miniature daffodils and the crocuses were discussed quite fully last March and April and so we will pass them by this time except for two crocuses which were not included then. They are the Italian *Crocus etruscus*, flowering in March, which has a yellow throat and segments coloured bright lilac within and cream striped and feathered purple without and the Cretan form of *C. sieberi*, often known under the varietal name *heterochromus* or *versicolor*. In 1955 this crocus flowered in March and in 1956 in mid January. Its bright orange-scarlet stigma shows up most beautifully against the rich orange throat and the pure white segments. The bands or stripes on the outer surfaces of the segments are of a crimson shade of purple. *Scilla*, a member of the family Liliaceae, has a wide distribution over Europe, Asia and Africa. *S. tubergeniana* was introduced twenty-five years ago from N. Persia by Messrs. C. G. van Tubergen and is a most attractive addition to any garden, being a vigorous, free-flowering plant. Each 4-inch high scape bears eight or more flowers. The fully expanded perianth measures almost 1½ inches across and is striped externally with blue on a ground colour of mauve. Closely related is the Russian *S. siberica*. This bulbous plant was given the Award of Garden Merit in 1928 and still is one of the best bulbs for naturalizing in the border or among shrubs. In the Alpine House may be seen the clear blue form grown under the name 'praecox.' Two near allies of *Scilla* are *Chionodoxa* and *Puschkinia*. The former is distinguished from *Scilla* by having united perianth pieces and from *Puschkinia* by having free stamens. *Chionodoxa luciliae* from Asia Minor and Crete has three to six intense blue flowers hanging on slender pedicels from a 6-inch-high spike. The white-flowered form 'alba' may be seen in the Alpine House and there is also available a pink-flowered one. From the Orient *Puschkinia scilloides*, also known as *libanotica*, makes a good display in late March and early April when the scape reaches 4 inches in height and bears blue flowers 1 inch across. In April there is to be seen an unusual tulip from central Asia with the almost unpronounceable name of *borszczowii*. It has bell-shaped flowers made up of crimson, black-purple blotched segments.

Towards the end of the month one can expect to see flowering *Kelseya uniflora*. This evergreen under-shrub has formed itself into a very compact cushion on which appear almost sessile minute white flowers. This rare member of the Rosaceae was introduced from Montana in 1939. Other interesting plants to be seen at this time of year include *Erodium hymenodes* from the Atlas Mountains, the Manchurian *Jeffersonia dubia*, *Soldanella alpina* and *S. montana*, both with

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a wide distribution over Southern Europe and the Caucasian *Draba bryoides* var. *imbricata*.

If the visitor departs from the southern end of the Alpine House he will come out on the Weather Hill where he may observe that the old pear collection has been removed. These pears were planted some fifty years ago and so have reached the end of their useful life. All the varieties now are represented either in the cordon pears planted by the side of the Model Fruit Garden or in the collection of the National Fruit Trials. For the time being the ornamental cherries have been left in place. The whole area has been double dug and will most probably carry a crop of potatoes this year.

Also under the axe this winter were the apple trees near the Herbaceous Borders in front of the Hostel. These trees were part of MR. WILSON'S original orchard which was in existence when the Society first came to Wisley fifty-two years ago. This area has also been double dug and will be used this year to grow the trials of dahlias and gladioli.

PLANTS OF INTEREST AT WISLEY DURING MARCH

GLASSHOUSES

Abutilon × *milleri*
Anthurium scherzerianum
Aphelandra pectinata
Chorizema ilicifolium
Chrysanthemum foeniculaceum
Epidendrum ciliare
Grevillea rosmarinifolia
Jasminum primulinum
Lycaste lasioglossa
Mitriostigma axillare
Streptocarpus caulescens

ROCK GARDEN AND ALPINE HOUSE

Draba aizoon
Erythronium dens-canis
Fritillaria pudica
Narcissus species and varieties
Primula species
Pulmonaria angustifolia
Sisyrinchium douglasii

WILD GARDEN

Erythronium dens-canis
„ *revolutum*
„ *tuolumnense*
Galanthus species and varieties
Pieris floribunda
„ *japonica*
„ *taiwanensis*
Shortia uniflora

SEVEN ACRES

Erica species and varieties
Forsythia species
Prunus sargentii
Salix gracilistyla
„ *repens argentea*

BATTLESTON HILL

Camellia cuspidata
„ *japonica* varieties
„ *saluenensis*
„ × *williamsii* varieties
Cornus mas
Erica species and varieties
Magnolia kobus
„ *stellata*
Pieris japonica
Prunus varieties
Rhododendron species and varieties

AWARD OF GARDEN MERIT COLLECTION

Daphne mezereum
Forsythia intermedia var. *spectabilis*
Magnolia × *soulangiana*
Osmanthus delavayi
Prunus cerasifera var. *atropurpurea*

AUTUMN BULBS FOR GARDEN AND COLD HOUSE

E. B. Anderson, M.Sc.

(*Veitch Memorial Medallist*)

(*Lecture given on Sept.* 6, 1955; MR. G. L. PILKINGTON *in the Chair*)

"SOMETIMES when all else seems transient only a flower remains beautiful, sturdy and forever the same. Wars, devastation, floods, pestilence, changes of governments—none of these things affects the eternal beauty of the tulip. And as life has pressured me I have increasingly turned to my bulb garden for peace and relaxation. Every fall finds me planning and planting and in the spring from the time of the earliest crocus my heart becomes gay with the flowers." WALTER ROOZEN in the introduction to T. H. EVERITT'S, *The American Gardeners' Book of Bulbs*.

What better text by a member of a nation, which has suffered much, could one find for a talk on bulbs?

For reasons with which I need not weary you the date of this lecture was advanced. Therefore I am including some late summer plants in the hope that the interest of the lecture will be enhanced thereby. I interpret the word bulb in the usual way to include corms and tubers. In the time at my disposal it is not possible to deal with all those which may be grown in the open or with slight protection in this country, but all those I shall mention I grow or have grown myself. I include the cold-house because some of those I am able to grow in the milder climate of the north coast of Somerset may require such protection elsewhere.

The principles of bulb cultivation are well known; they require good drainage, a fertile soil, most of them sun, and usually a period of rest during which, in some instances, soil temperature plays an important part. As in all things there are exceptions but, by and large, I think the above covers this part of the subject.

Before dealing with the plants themselves I wish to enter a plea for more amateurs to grow bulbs from seed, particularly the less common ones. One may exclaim at the time which may elapse between sowing and flowering, but the time passes rapidly if the practice is continued each year. If fresh seed is sown not later than August many bulbs will reach the flowering stage in two and a half to three years, e.g. *Cyclamen* and *Galanthus*, or at the most four or five, and what is that when one considers the average length of life nowadays? If fresh seed is not available, by fresh I mean seed of the current year, I advise leaving sowing until June when many will germinate before the autumn, even in a few weeks; others may not appear until the following spring. If fresh seed is not available I do not recommend your trying *Colchicums*

or *Juno Iris*, which, under such conditions, may take up to four years to germinate and another four to reach the flowering state. The sensible thing is to obtain a bulb or two and then to work up stock from your own fresh seeds. The seeds are sown in a suitable compost and the pots placed in a partially shaded position outside until germination takes place, they are then removed to a cold-house or cold-frame. The bulbs are left in the same spot for two to three years according to the time required to reach maturity. They are then repotted or planted outside if large enough.

Let us now turn to the bulbs, which for convenience of reference I deal with in alphabetical order. *Allium* is not a very popular genus although it contains members suitable for all positions and of all shades of colour, the majority of which are easy to grow. One cannot prophesy which particular one will become a nuisance in a garden, the only thing to do is to eliminate an offender at once. The only species within my purview is *A. stellatum*, a North American species which is flowering now and looking perfectly happy and green despite drought and a very dry position; it has heads of lilac pink flowers on foot-high stems.

The last *Alstroemeria* to flower with me is *A. hookeri* introduced from Chile by H. J. ELWES; in very gritty soil it is 6 to 9 inches high and each stem bears up to a dozen charming pink flowers with a yellow flash on the upper petals, which are flecked with red. J. G. BAKER (*Handbook of the Amaryllideae*, p. 139) states that he cannot distinguish this plant from *A. ligtu*, but, as I grow it, it is distinct both in time of flowering, *A. ligtu* being over long before this starts, and in stature.

Amaryllis means *A. belladonna* in one of its many shades of pink and with its delightful scent, but I know of no sure recipe to make it flower outside. It seems to require a dry July and August and a fairly high temperature during this period. Last year in the Porlock area with its heavy rainfall not one of the many hundreds of bulbs produced a bloom. Normally we get a fair sprinkling, but there is something missing, as when the leaves appear sometimes also do aborted buds. MR. HANGER told me to plant the bulbs on the surface near a wall and to protect with bracken in the winter, but this has so far failed in its object. I have read that in South Africa it flowers most freely in burnt-over areas. The best results I have had and seen were from bulbs planted out in a cold-house. Those who are fortunate enough to have no troubles with this plant should try to obtain the new varieties which have been raised, I believe, in South Africa.

Despite the difficulties I must mention the exquisite white varieties 'Hathor' and 'Baptisii alba,' surely among the most beautiful of flowers. 'Hathor,' called after the Egyptian goddess of beauty, was raised by a MR. BRADLEY of Sydney, N.S.W. Through the kindness of his niece I am able to give the information that it occurred as a chance seedling among many of the normal colour in a paddock in which he grew his large collection of seedlings. His wife first noticed it in bloom and cut it for the house; imagine his feelings when he arrived home and saw

it there! Fortunately it was found possible to identify the bulb from which it had been cut. MR. BRADLEY tried to reproduce it by selfing and by crossing with other forms, but the seedlings always reverted to type. I have been unable to trace the origin of the other, but MR. BRADLEY had a friend named BAPTIST and it seems reasonable to suggest that either he or MR. BRADLEY raised it. There are other albinos, but they all present the same problem as regards flowering, but their beauty justifies continued trial.

In *Bomarea* × *cantabrigensis* it is possible to include one member of a large and beautiful genus, for this hybrid between *B. caldasiana* and *B. hirtella* grows outside one of the houses in the Cambridge Botanic Garden as well as with me. As it flowers on the current year's growth it is not dependent on a mild winter to the same extent as others. It bears clusters of small but charming flowers, pink and pale green externally and yellow spotted with brown inside. Several of this genus grow at considerable heights in the Andes and should be hardy with some protection. JOHNSON in his dictionary describes *B. salsilla* as hardy, but so far I have not been able to try this.

You may grow *Chasmanthe* as *Antholyza*, a neglected genus of montbretia-like aspect but much taller and more graceful with orange flowers having a curious bend in the middle. The species I grow is called *Chasmanthe caffra*, but there are others worth trying. I think they do not like blazing sun all day and, in fact, I believe they will tolerate considerable shade.

Colchicum embraces some of the most useful autumn-flowering bulbs if used correctly, but as late as the 1952 edition of the handbook of Crocus and Colchicum the late E. A. BOWLES, referring particularly to the hybrids, had to write "but they have never been planted so widely and freely as their hardiness, earliness and freedom of flowering should have ensured." The reasons for this I suggest are two, one that the spring foliage of the forms usually available is massive, ugly and in the way, the other that with the exceptions I shall mention, the perianth tube is so long and slender that the autumn winds and rain soon beat them to the ground and helped by slugs ruin their beauty. The solution is simple; plant under deciduous trees where they are quite happy and the foliage no eyesore, and preferably where there is rough grass to support the flowers. The best results I have seen were in an old apple orchard. The exceptions which may be planted in choice positions are *C. cilicium* and its form *purpureum*, which have shorter and stronger perianth tubes. There are lovely illustrations of these two forms in JOURNAL R.H.S., **76**, Figs. 40, 41. Equally dwarf is *C. agrippinum* with chequered flowers. *C. autumnale* and its forms have much neater foliage but still need some supporting growth; in this species the deep-coloured *atropurpureum* should be eagerly sought. Any of the larger species and hybrids are worth growing but outstanding are *C. speciosum album*, *C.* 'Water Lily,' and the hybrids raised by R. O. BACKHOUSE named 'Darwin' and 'Huxley' (Fig. 38). It seems a pity that hybridization has

in the main been confined to the larger species, but I have one neat and charming hybrid, 'Mr. Kerbert,' which suggests *autumnale* blood. MR. KERBERT, by the way, was the owner of a Dutch bulb firm now extinct and raised most of the hybrids now in commerce. *C. variegatum*, the best of the tassellated species, can be grown outside, but as it flowers late it is best grown in a pot. Slugs are so fond of the leaves and flowers, which are small, that I cannot record any worthwhile success with the little species, which in any event are difficult to obtain.

Despite the all-embracing nature of MR. BOWLES' handbook, I have ventured to make a few remarks about *Colchicum*, but his review of *Crocus* is so masterly that all I shall do is to mention a strange omission of his, the superbly beautiful *C. speciosus* 'Oxonian' and to emphasize the fact that *C. tournefortii* remains open in dull weather. *Cyclamen* are one of the mainstays of the autumn garden. *C. neapolitanum* and its lovely white variety, now becoming rare, should be everywhere. The latter, at least, should be regularly raised from seed, as, if sown as soon as ripe, it can be flowered in two and a half to three years. The pods are ripe as soon as the coiled stalk loses its spring, I mention this because if there are any ants in your garden they will empty a burst pod in a night. It is worth noting that there are scented forms of this species. Very like *C. neapolitanum*, but usually flowering later, is *C. africanum*, its flowers are no larger but the subsequent foliage is magnificent; it also may be scented. It requires a warm sunny corner. Following this is a doll's house miniature which I have provisionally named *C. cilicium* 'alpinum' while waiting for the verdict of the authorities. I believe all the corms in cultivation are the progeny of the one I received from E. K. BALLS's expedition to Turkey. The leaves are small and round, the flowers pink or nearly white on 1-inch stalks and themselves about ¼-inch long. The real *C. cilicium* is the last to flower and is as charming as the others, but for some reason it is not very common. I think it prefers a drier and warmer position than the others; it is just as easily raised from seed. *C. graecum* should be grown if only for the beautiful velvety surface of its marbled foliage (Fig. 39). With the exception of unique gardens like COL. STERN'S it is a plant for the cold-house and requires a thorough baking in the summer if it is to flower. The same remarks apply to *C. pseudo-graecum* from Crete.

For ordinary garden purposes *Crinum* means *C. powellii* a hybrid of *C. longifolium* and *C. moorei*; there are several forms, but nothing more beautiful than the white. It is very hardy, loves rich food and plenty of water when coming into flower.

Eucomis cannot be called a popular genus, but the greater appreciation of greens which flower decoration has called forth and the pine-apple-like inflorescence always attract attention in my garden. They are hardy as far north as the Midlands; at least, against a wall. *E. punctata* and *bicolor*, both green and purple, are those most frequently seen, but there is an interesting dwarf about 1 foot high, *E. nana*, and on the other hand the giant *E. pole-evansii* about 5 feet tall whose

hardiness I have not yet tested, with creamy flowers looking as if moulded from candle-grease.

Galtonia candicans is common in herbaceous borders and I only mention this genus to advise avoidance of the much inferior *G. princeps*.

Galanthus olgae is the commonest of the autumn-flowering snowdrops, the perfect flowers appearing before the leaves. *G. rachelae* and the, I believe, extinct *G. elsae*, are doubtfully distinct. I know that at one time this was MR. BOWLES' opinion and at three score years and ten I still hope that I shall see the final verdict in the long-awaited book!

Among wild *Gladioli*, which are all that interest me, although the florists' varieties fill me with awe and wonder, the original *G. primulinus* is still worth growing, but the king of the hardy ones is *G. saundersii*, from the Drakensburg mountains of Natal. As I grow it, it is about a foot high and bears large, scarlet-hooded flowers with a pure white marking on the three lower petals. Although I have had the plant since MRS. MILFORD collected it I do not find it one of the easiest to grow. I think it wants a moist soil and not too much sun; plenty of leaf-mould and some feeding are indicated. Unfortunately, it has not yet set seed with me which would give stock for experimentation.

Under *Hippeastrum* we meet an astonishing plant, *H.* × *acramannii*, which should not be hardy but is. For its history I am indebted to LADY MOORE, whose father-in-law, DR. MOORE, planted it in the Glasnevin Botanic Gardens before 1857; what possessed him to do this will never be known. It was raised by James Garaway & Co., nurserymen, of Bristol, in 1835, by crossing *H. aulicum platypetalum* with *H. psittacinum*. It first flowered in March 1839 and was given its name in honour of E. ACRAMAN, a gentleman of Bristol City. As this plant is usually called "H. ackermannii" I have endeavoured to trace the history of MR. ACRAMAN, to verify the name, but without success. The flowers are a brilliant scarlet-crimson with a green flash, but compared with later hybrids the petals are narrow and this line of development was not followed up. It is of interest that I have recently been given a hybrid which may have originated from the same source, as it is grown by a farmer at South Molton who had it from the local doctor's wife who, unfortunately, is no more. Even at South Molton it is hardy outside but only flowers under glass. *H. acramannii* requires a warm sheltered position and, according to LADY MOORE, it flowers freely and regularly at Glasnevin. It is not so regular in my garden as the climate is wetter and it probably would do with more sun. *H. advenum* is easy in any well-drained sunny place or cold-house, bearing foot-high stems with several flowers which can best be described as ox-blood red. It is a native of Chile as far south as Valparaiso, and there is said to be a yellow form which would be worth introducing. It increases freely.

In the maritime south *Hedychiums* are hardy and, with protection, as far north as Cambridge, but to make them flower they require plenty of heat, water and food to make up for their being forced to be deciduous

most winters. The sweet-scented *H. coronarium*, *H. gardnerianum* and the brilliant *H. coccineum* are possible outside but better in big pots inside; *H. spicatum*, poor in flower but good in fruit, is even hardier. A species recently introduced from Bhutan, *H. densiflorum*, seems to be naturally deciduous and, therefore, hardier; it has not the beauty of the larger species, but is attractive to those who like the family, with its dense spikes of orange flowers.

Hypoxis are seldom seen but are useful with their bright yellow star-shaped flowers. Both *H. rooperi* and *H. villosa* are hardy in a south border, the former being the better plant; they flower for several months.

Leucojum means for most gardens the cheery *L. autumnale*, well known to all and without fads but perhaps less well known is the fact that at Wisley there is a stronger-growing form which appears to be sterile, at least at Porlock (Fig. 40). The lovely little pink *L. roseum* is hardy but so small that it is best in the cold-house.

Lilium speciosum and *L. henryi* are well known as relatively late-flowering species, so that all I will do is to extol the Esperanza strain of the former, but the lily I do want to tell you about is *L. sulianense* 'Sulphur Queen,' one of the hybrids between *L. aurelianense* and *L. sulphureum*. A most lovely lily of fine constitution growing up to 8 feet and bearing up to a dozen deep canary yellow flowers with a green flash at the tips and brown outside. It has the virtue of bearing numerous bulbils on the stem. Later still and probably only to be grown in a cold-house is the rare and beautiful *L. catesbaei*. I grow it in a mixture of peat, leaf-mould and sand kept very moist except in January. The single flower is very like *L. philadelphicum*. I am told it is naturally short-lived, but it is so beautiful that it is worth growing for a year or two of beauty. I started with six seedlings, last year had five plants with three in flower, this year there are four plants with two in flower ; it may be copying the fate of the ten little nigger boys. It is much to be desired that some of the other forms like *L. catesbaei longii*, which may be easier, should be introduced.

Mirabilis jalapa is a strangely neglected tuberous-rooted plant. It is quite hardy and bears in the evening sweet-scented flowers, red, white or yellow, which last until about ten o'clock next day. Perhaps a trifle leafy, but breeding could overcome this. As it wants room, please do not rush to plant it among your choice things.

In *Nerine* we have the most beautiful and accommodating of autumn bulbous plants. The most useful is the summer-leafing *N. bowdenii*, which come sun, come rain, never fails to produce its rose-pink blossoms, so different from *Amaryllis belladonna*. It was found by a MR. CORNISH BOWDEN in the mountains near King William Town, Cape Province, and sent to his mother at Newton Abbot in 1903; it fell on fertile soil and is most plentiful in the South-west. Anywhere in the South it will grow and bloom in the open, in the Midlands and further north it probably needs a south border and is well worth it. There are several forms of what we may call ordinary *Nerine bowdenii*, a pale pink

rather rare, a white which seems to have lost its power to flower, a darker form which I obtained from Ireland, which may be the same as the Highdown form, and a form with a different tone of pink which I found in my garden. Then there are two robust forms, *N. bowdenii* 'gigantea' and 'Fenwick's var.'; these two differ only in the number of chromosomes, see JANAKI AMMAL, JOURNAL R.H.S., **76**, p. 365. In saying this I mean that they are indistinguishable horticulturally and in so doing differ from DR. AMMAL. *N. flexuosa* and its white form are winter-leafing, but there is a robust summer-leafing variety, *N. flexuosa sandersoni*, collected by DR. WELLS in the Natal National Park at Mont Aux Sources at about 11,000 feet. It has very large leaves and very crimped lilac-pink flowers and because of its summer-leafing habit seems quite hardy. (I do not understand DR. AMMAL referring to this species as white, neither J. G. BAKER (*Handbook of the Amaryllideae*, p. 101) nor WEATHERS suggest that it is other than pink.) Other species which seem hardy, but, being winter-leafing, require a summer baking if they are to flower, are the somewhat uncommon *N. flexuosa* itself and its lovely white form, also *N. curvifolia*. I should have said they were essentially cold-house plants had I not seen an old clump of *N. flexuosa alba* against a house wall in the late MRS. BOTFIELD'S garden at Albrighton. It is said to flower freely.

But the story of hardy nerines does not end here as *N. bowdenii* has fortunately passed on its useful characteristics to its offspring. The most striking are *N.* 'Hera' (Fig. 44) and *N.* 'Aurora,' crosses with *N. curvifolia*; they have the brilliance of the latter but do not flower quite so freely with me. They have the disadvantage that the head of bloom is so heavy that they become swan-necked unless they are staked. Crossed, I assume, with *N. flexuosa*, it has given *N.* 'Pink Beauty,' a most valuable free-flowering plant which frequently carries heads of perfect flowers as late as the middle of November; similar is *N.* 'Fuchsine' which with me is not so free-flowering. I have still another *N. bowdenii* hybrid made by HERBERT CHAPMAN by crossing it with 'Motley.' It is a delightful crushed strawberry colour with a tinge of the mauve some nerines are showing.

There is a cross between *N. bowdenii* and *Amaryllis belladonna* called *Nerine fletcheri*; so far I have never flowered it and, in his far more favourable conditions, I understand, COL. STERN has flowered it only once. In view of these observations and the fact that it was sixteen years before the cross first flowered, I think DR. AMMAL unduly optimistic in suggesting that this line opens new possibilities in breeding! I grow several of the miniatures such as *N. masonorum* and *N. filifolia*, charming doll's house plants for the cold-house, but I doubt if any use outside.

In the vast genus *Oxalis* the only one to interest us here is the charming dwarf brilliant gold *O. lobata* from Chile, easy in any sunny spots.

As *Roscoea purpurea* grows in the Himalayas at 8,000 to 10,000 feet, it is not surprising that it is hardy; its flowers are purple with the usual large lip, and it is still more noteworthy in the palest lavender form,

pallida. Roscoeas like plenty of moisture in the growing seasons—I am told they are bog plants in Nature.

Schizostylis coccinea always brightens the autumn with its scarlet blooms, or pink as in the variety 'Mrs. Hegarty' which occurred as a chance seedling in the garden of DR. JOHN HEGARTY of Galway. In our damp climate it is almost a weed, which is understandable when one knows that at home it grows by stream-sides. The pink 'Viscountess Byng' flowers so late that it is better in the cold-house. All the forms increase so rapidly that one does not think of raising it from seed, but by doing so I understand several new colours have been raised in South Africa, and remembering 'Mrs. Hegarty' and 'Viscountess Byng' it might be worth doing here. I have omitted to say that there is also 'Professor Barnard' which is bluer in tone than the type.

There is only one *Scilla* within our range and that is *Scilla chinensis* or *Bernardia scilloides*, bearing spikes of lilac flowers, not of great importance but useful for a warm and dry spot.

For all practical purposes *Sternbergia* means *S. lutea*, particularly the form *angustifolia*, which grew and flowered so freely in MR. BOWLES' garden and flowered with me even after last summer's drenching. I have had others but cannot record any permanent success. I am inclined to think they require a good summer baking and some like *S. lutea graeca* and *sicula* are none too hardy. The yellows of all are so pure that any are worth trying (Fig. 41).

Syringodea is a rare genus in the Iridaceae and I should not have mentioned it but for the fact that I have a species collected by MRS. MILFORD on the Basutoland plateau which is perfectly hardy and in autumn bears freely small bright yellow flowers like miniature Sternbergias amid filiform leaves.

Although *Tricyrtis* appears both in WEATHERS and GREY I do not feel justified in even calling it a tuber, but if you want to know the best one, I think it to be *T. formosana*, grown in a shady corner.

Tulbaghia is a South-African genus and *T. violacea* is hardy in the South-west but a cold-house plant elsewhere, but worth growing for its pure lavender blooms. Its crushed leaves smell of garlic.

The last letter of the alphabet gives us *Zephyranthes*, *Z. candida* is known to all with its charming white crocus-like flowers, easy in a sunny place, preferably in a light soil. *Z.* 'Ajax' is a lovely cream-coloured hybrid between *Z. candida* and *Z. citrina*; so far I have had only limited success with this, but it is worth struggling with. A lovely genus, but nearly all greenhouse plants.

This ends the list of those late summer and autumn bulbs with which I have had success sufficient to justify my mentioning them and by doing so I hope to encourage others to try them.

People often ask about this or that rare plant: how does one get hold of it? The answer is the old law of economics, demand creates supply, and, therefore, go on demanding.

INSECT LIFE IN THE SOIL

Herbert W. Miles
(*Wye College*)

(*Lecture given on August* 9, 1955; COL. F. C. STERN, O.B.E., M.C., F.L.S., V.M.H., *in the Chair*)

FROM the tops of our highest mountains, through our woods and rich farmlands down to our pleasant river valleys, soil is more or less abundant—and it harbours such a wealth of insect life that few of us can claim more than a nodding acquaintance with it.

From the mountain top right down to the sea's edge (and even beyond it!) we may find SPRINGTAILS. These are primitive insects, sometimes colourless, sometimes covered with brilliant scales, whose jaws are only such as to permit them to scrape the moist surfaces of rocks, soil, fungi and plants for tiny fragments of organic waste. Young and adults resemble each other closely and never at any time do they grow wings. In the small species several may sit comfortably on a lettuce seed, while some of the larger species of our woodlands may exceed a quarter of an inch in length. They prefer shady and moist situations and abound in the rich soil of gardens. They carry bacteria and fungus spores about on their legs and bodies and so are an important factor in the promotion of the decay of nature's waste materials.

Occasionally they occur in unexpected numbers in greenhouses and mushroom sheds, but if necessary are controlled with little difficulty by D.D.T. and nicotine dust.

But perhaps it is in our more open deciduous woodlands where the tall trees, birch or oak, are not too dense and where there are sunny glades with shrubs and grassy patches, that we find the greatest range of interesting soil insects. Here may be found in early summer several species of daddy-longlegs or crane flies, and several species of chafer beetles or " clocks," to use their old English name.

These two kinds of insects illustrate the more familiar type of life-history and the associated changes in appearance, spoken of as metamorphosis, that the insect assumes in growing up from egg through the immature (feeding) stages, through the pupal or chrysalis (resting) stage to the perfect insect, the sexually mature adult.

LEATHERJACKETS

The female crane fly rests in the deeper shade of grasses and vegetation during the hottest part of the day, but mornings and evenings and on mild dull days she may be seen hovering quite near the soil surface and often probing it, where it is bare, with her tail. It is at this time that she is laying her polished black eggs either directly into soil crevices or down on the surface of the soil where the rain may easily wash them in deeper. When conditions are favourable as many as three

hundred eggs may be laid in a square foot of soil. The eggs hatch in about a fortnight and the maggots are soft and wrinkled and legless and they have a somewhat pointed head-end and a blunt tail with a few projections. They are restless and active and feed on plant material at the soil surface. The head is provided with biting jaws and is capable of being exserted or withdrawn at will into the fore part of the body. The maggots, like all other insects, grow by shedding the skin from time to time, and when nearly full grown and an inch or so long, they are dark brownish-grey in colour and much wrinkled. They are well known to farmers and gardeners as leatherjackets and they may occasion some anxiety in wet seasons, or on low-lying or poorly drained soil. Normally, leatherjackets feed on dead and dying roots of plants and in the vegetable accumulations at or in the soil surface. It is only when this natural food supply runs short or towards the end of its feeding period that the leatherjacket may attack healthy plants. When fully fed, leatherjackets descend a little deeper into the soil and shed their skins to become chrysalids. The chrysalis is dull brownish in colour and is provided with spines so that at the appropriate time it can wriggle up to the surface to enable the new crane fly to emerge into the air. The chrysalids can be found at the soil surface from June onwards. (Most of us are familiar with them protruding in the poorer or thinner places in our lawns—the " horns " or spiracles of some species often giving them a rather curious appearance.) This emergence usually takes place in early morning and is evidently a somewhat critical process hampered rather by the length of the legs. The pupal skin splits in the head region and the insect within levers itself forward by means of the spines and bristles on its legs. The body and legs harden quickly and the single pair of wings expand slowly to their full extent and, after a period of drying in the early morning sun, the insect flies into shelter. Birds are fond of leatherjackets and their chrysalids, and blackbirds, rooks, starlings, peewits and pheasants find in them a useful part of their diet (Fig. 42, *a–d*).

THE COCKCHAFER

The cockchafer is a common woodland insect that spends the daytime in hiding amongst the foliage of the trees and bushes. If these are shaken the insects can be dislodged and picked up for examination. They are seen to be strong horny beetles about 1–1¼ inches long, with distinct head and dark eyes, and having short, elbowed feelers with the tip lamellated, that is carrying six or seven flattened processes or plates that are capable of being opened and shut in a curious way. The legs are long and strong and have several stout spines on them; the body is hidden by brown sheath wings, but its tip is exposed and is seen to be covered with fine silky pubescence of a lovely yellowish-grey colour. The sheath wings (elytra) may be lifted to expose the neatly folded flying wings. These may in turn be carefully unfolded to reveal the beautiful mechanism that allows the wing to be folded fanwise and then across to stow it under the sheath wing. The cockchafer is a strong flier in the

evenings in search of a mate, or a suitable site in which to lay its eggs. It feeds on the tender foliage of deciduous trees and shrubs and sometimes occurs in large numbers in hawthorn trees at blossom time. The cockchafers are also attracted to light and occasionally enter our houses after nightfall (Fig. 43, *a* and *b*).

The female beetles lay their eggs in clusters in the soil and may penetrate it for several inches for this purpose. The eggs are round to oval in shape and about 3 mm. long and whitish to cream coloured. They may occur in small clusters of half a dozen or so, or large clusters of several scores. They hatch in about a month and the young grubs have distinct brown heads, strong biting jaws and a white curved and segmented body with three pairs of legs on the three segments immediately behind the head. The grubs are active feeders and devour the vegetable matter in the soil and notably the dead and dying roots of herbaceous plants and trees, and later feed upon any young fibrous roots that occur in their feeding zone. As they grow the body segmenting is more easily seen and so are the breathing pores, or spiracles that are partly hidden in its folds. The grubs live for three or four years and finally attain a size of $1\frac{1}{2}$–$1\frac{3}{4}$ inches long. They are then fleshy, and the last three or four segments are so swollen and distended that, if turned out on to the surface soil, the insect can only drag its body clumsily along, the after part lying on its side. In the autumn or in the early spring, when fully fed, the grubs burrow rather more deeply into the soil and fashion an earthen cell, first by turning about frequently and exerting pressure upon the soil and then by lining the walls with soil mixed with saliva. In such cells the grubs shed their skins and become pale yellow, soft-bodied pupae, clothed with a fine transparent membrane through which the outlines of the developing insect can be seen. In the course of time the pupae darken and turn brown as the outer skeleton takes on its adult rigidity and colouring. In some cells the beetles are fully formed by the late autumn, but usually this happens during winter or early spring and the insects are strong and ready to bite their way out of the cells and struggle up through the soil to emerge at their customary flight period in May and early June. As often happens with insects that have a long developmental period, the cockchafer has swarming or epidemic years when the beetles are abundant and intermediate years when it attracts little attention. The cockchafer and its grubs are troublesome to the forester when they infest his nurseries and young plantations, and to the fruit-grower when, as a legacy in newly broken land in wooded country, they attack his strawberry plants and young apple trees. An instance is recorded where large numbers of cockchafers were disturbed and took flight during daytime when a plantation of loganberries was being dusted with pyrethrum insecticide against the raspberry beetle *Byturus tomentosus* (5).

In nature the crane fly and the cockchafer may perhaps be taken as examples of insects that normally live in soil rich in humus and in partly decaying plant remains. If these become exhausted before the

insects reach maturity living plant roots and related tissues may be attacked, and the insects' status change from plant scavengers to pests.

THE DOR BEETLE

Insects are not the only creatures that frequent the open glades and forest clearings. Animals browse there on the vegetation or lie screened alike from their enemies and from strong sunlight and the torment of biting flies. Such animals include rabbit and roe-deer and these may be taken as representative also of the fallow-deer in our parks, the sheep on our downs and hillsides and the cattle in our pastures. The grazing animals pick and choose their vegetable diet, and having taken and digested their fill, their alimentary systems reject the unwanted residues as dung. This dung is largely organic matter and it is seized upon by various insect species as food material for their own offspring. These insects also fulfil the role of scavengers and break down and further distribute organic waste so that nothing is lost and the essential elements are again made available for plant and animal life.

Examples of the stercorarii or dung-shifters are the scarab beetles of Egypt and the Mediterranean countries and the dor beetles of northern Europe. We have several species of these dumbledors of the genus *Geotrupes* in Britain. They are large, dark, glossy, blue-green beetles (Fig. 43*c*) that fly at dusk with the low-humming sound commemorated for us by Thomas Gray in the lines

> 'Now fades the glimmering landscape on the sight,
> And all the air a solemn stillness holds,
> Save where the beetle wheels his droning flight,
> And drowsy tinkling lull the distant fold. . . .'

The poet very rightly associates the dor beetle with the sheep-fold, for there it would find its pabulum in plenty!

The beetles excavate burrows in the soil near the dung and when these are of sufficient depth, often from 8 to 18 inches depending on the nature of the soil, they detach portions of the dung and, moulding each portion into a convenient mass, move it through their tunnels to a suitable side chamber where it is pushed into the blind end and, receiving an egg, is housed as the food supply for the future grub. The sexes are said to share this work of preparation and frequent one set of galleries for some time, depending on the abundance of supplies relatively nearby.

The grubs of the dor beetle somewhat resemble those of the cockchafer, but have rather more massive heads, a slightly different arrangement of legs* and more conspicuous external plates at the openings of the spiracles. When they are fully fed they are much swollen and lie on their sides in a sharply curled fashion with the tail often up against the

* In the chafer grub the third pair of legs are as long as, or longer than, the second pair, but in the dor-beetle grub the third pair are extremely short, much shorter than the second pair.

legs. They pupate in earthen cells in their feeding sites. In the cells they shed the outer skin of the grub and the white soft-bodied chrysalis then revealed is helpless and defenceless for the greater part of the pupal period. It can only turn constantly, pivoting on its tail so as to keep the little air it needs constantly circulating round it and so preventing the growth of harmful fungi and bacteria upon its body. When the young beetles are ready to emerge they bite a neat circular hole in the upper part of the cell and work their way through the soil to the surface. This they are easily able to do by means of their strong thoracic muscles and the armature of strong teeth, spines and bristles with which their limbs are furnished (Fig. 43*d*).

Dor beetle grubs are only occasionally troublesome on fruit farms and in gardens, either when pasture land has been ploughed or when fresh manure has been left in heaps for some time before being spread and ploughed in.

PREDATORS

Because of the debris on its surface, the many cracks and crevices in it and the wide variety of sites it offers, the soil is used by many kinds of insects as a shelter during winter when it may be covered with snow, and as an environment in which to form their cocoons and pass their relatively unprotected pupal stages.

This applies particularly to the many leaf-eating insects that frequent both forest and fruit plantation, meadow and pasture, park and garden. The winter moth and its allies, the many kinds of looper caterpillars, the sawflies of willows and of gooseberries are all leaf-eaters and come into the category of temporary sojourners in the soil and, when entering the soil as caterpillars, or leaving it as somewhat fragile adult insects, they may fall a prey to another type of soil insect—the predator. Perhaps the best known and most generally recognized of these are the carab beetles; many species are large and dark coloured, violet and black or greenish-black, and red-legged and they have strong spiny legs with well-developed claws, and have stout sharp mandibles. These insects are fierce hunters and they have been so successful in their predacity at the soil surface that in the course of their evolution some species have lost their membraneous wings, and their sheath wings are firmly united on their backs presumably in this way giving them extra protection at the expense of ability to fly. Even so they are by no means earth-bound and some species, like *Calosoma* in the New Forest and in the Forest of Dean, will climb to the tops of trees in search of their caterpillar victims. Should there be any shortage of their usual food some species will even tackle such difficult prey as the common slug.

The grubs of ground beetles are also carnivorous and live in or upon the soil. They are elongate creatures somewhat resembling wireworms but have slightly longer legs and stouter body, tail feelers (cerci) clothed with long sensitive hairs and well-developed jaws that are toothed and sickle-shaped, so that when they are once fixed in their prey the

unfortunate insect has little chance of escape in spite of its desperate struggles. There are upwards of seven hundred species of ground beetles in Britain (4) and they are so plentiful that representatives of them occur in almost every spadeful of soil the gardener turns and under every board or stack of pots or bricks left for more than a few days. With predaceous insects so plentiful there is no doubt that large numbers of leaf-eating and other soil-frequenting insects fall a prey to them.

FOUR CLASSES OF SOIL INSECTS

The soil, for our purpose, is thus seen to be populated by several large classes of insects:

(i) scavengers, both those that devour plant waste and those that feed upon organic waste from animals;
(ii) sheltering insects that have secured their livelihood by feeding upon living plant material, e.g. caterpillars ;
(iii) predaceous insects that devour those of any of the other categories; and
(iv) parasites, that live within the bodies of their insect hosts, whatever their category or status; these also are destroyed by group (iii) whenever opportunity offers.

An example of a parasite is the tiny proctotrupid wasp that attacks wireworms. It is called *Paracodrus apterogynus* Hal. and, as the name implies, the females of this species are wingless, and they have a permanently curved ovipositor sheath. When the parasite finds a wireworm she grips its body with her legs and feeling for the soft membrane between two segments thrusts in her ovipositor and lays her eggs. These eggs hatch within the body-cavity of the wireworm and the young parasites live upon the fatty tissues of the host, injury to the vital organs being carefully avoided until the parasites are almost fully grown. At this time the whole of the body contents are devoured and, as the wireworm dies and its skin shrinks, the parasites push themselves partly through it and change into pupae; twelve or more parasites may issue from one wireworm.

CHANGING THE ENVIRONMENT

So far we have considered the soil and its inhabitants under more or less natural conditions when the interaction of climatic and biological factors have given some measure of stability to the environment. When agriculture or horticulture demands control of an area so that stock may be multiplied and crops produced, there is at once corresponding and related changes in the insect life of the area. When woodland is cleared and enclosed and grassland ploughed, livestock may be concentrated and their waste products accumulate; and instead of a wide and diverse range of natural plants the land may be required to grow a narrow range of crop plants in quick succession. Under these circumstances the scavengers in the insect population increase rapidly. Another type of

insect, one that feeds specifically upon the crop plants, is also attracted and multiplies with such success as the local climate, and duration of the crop, will permit.

An example of the specific crop feeders is the cabbage root fly, an insect that we have studied in some detail at Wye College (1). The flies are attracted to brassica crops towards the end of April and early in May, and they lay their eggs in the soil near the stems of the plants. The maggots that hatch feed upon the young roots and root tissues so that in some circumstances severe injury may result and the crop prove disappointing. As many as 1,200 eggs may be laid beside a single plant in the course of the season and more than eighty individuals may develop at the roots of one plant. When brassicas are grown in close succession not only is the area rendered more attractive to the cabbage root flies but also to their active and persistent predators and parasites, the small staphylinid beetle *Aleochara* and the parasitic wasp *Cothonaspis rapae*. The beetle burrows into the soil in search of the cabbage root maggots and seizing them in its jaws soon devours them. It also lays its eggs near the infested plant and the tiny active grubs bite their way into the bodies of maggots and new pupae and develop inside them. The parasitic wasp also enters the soil in search of the maggots and has proved to be a commonly occurring and successful parasite whose activities in checking cabbage root fly must not be underrated.

The change from semi-natural to artificial conditions brought about when grassland is ploughed for cropping has other repercussions. Insects like leatherjackets and wireworms, that produce little observable effect on the mixed vegetation of the grassland, are greatly disturbed and temporarily deprived of food and their moisture relations with the soil are seriously upset. When the land is then sown with cereals or planted with potatoes, as is common practice in many parts of Britain, these crops may be severely attacked, for there may easily be present more wireworms than grains of wheat sown and as many as forty wireworms to every seed potato planted. The losses from wireworm attack may continue for several years until a new adjustment between climate, site and husbandry or cropping practice has been brought about.

Under the conditions of renewed stability, with routine change, the several classes of soil insects settle down again to their relative roles, but there will be differences in their range of species and in the kinds represented, for instance there will be fewer wireworms and leatherjackets but more insects like root flies and weevils that are directly associated with the crops. There may well be more scavengers and more predators as the total numbers increase or the sheer weight of insect tissue increases with the better living conditions in soil under field cultivation.

CONCLUSION

The subject of insect life in the soil is a fascinating one and it has engaged the attention of entomologists at Manchester University, at

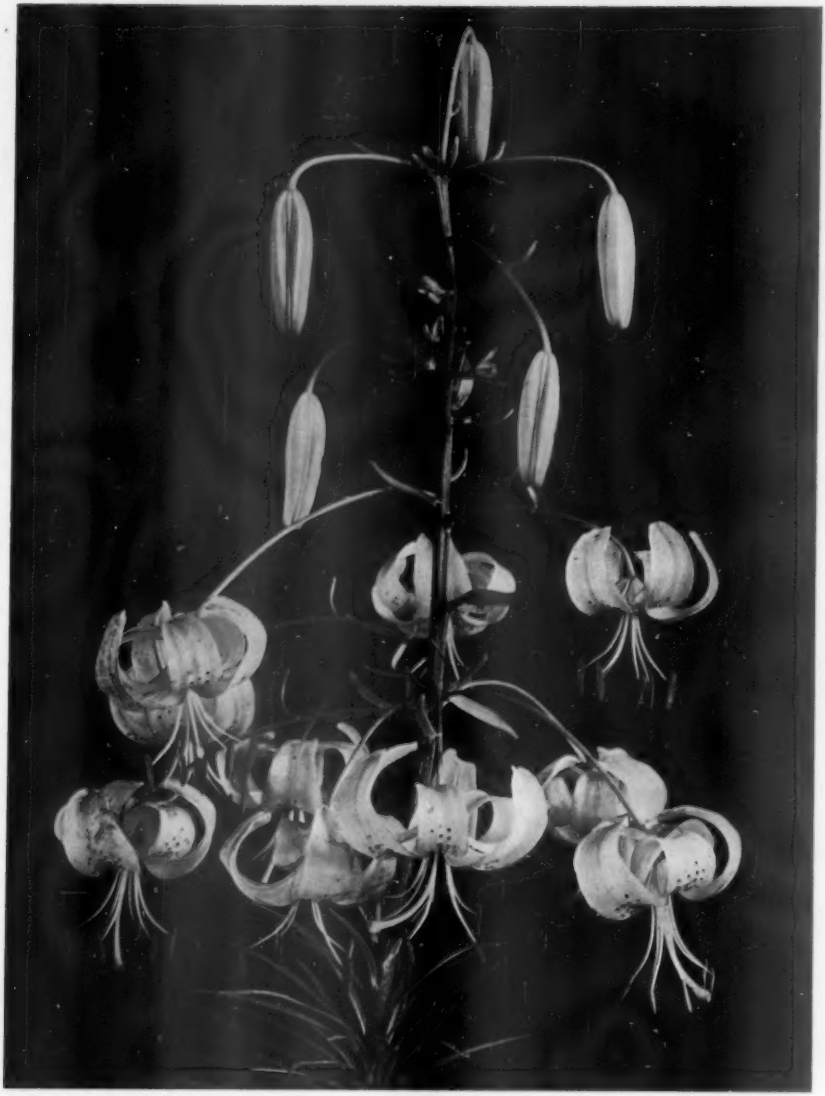
Rothamsted and at Cambridge University. DR. SALT (2) and his colleagues at Cambridge have extracted 42,753 insects and related creatures from 20 samples of pasture soil 4 inches in diameter and 12 inches deep, taken in November. This represents over 200,000 per square yard or 1068·8 millions to the acre—an amazing figure that may yet prove an underestimate. In this investigation there were, in the twenty-sample set (totalling approximately $1\frac{3}{4}$ square feet) the following representatives of the insects I have discussed:—

Beetles and other grubs	713
Flies and their maggots	109
Caterpillars	10
Parasitic wasps and ants	31
Springtails	over 11,000

The beetles represented plant feeders, predators and scavengers and the flies included plant feeders and scavengers. The parasitic wasps were only sparsely represented in these samples, though the wireworm parasite *Paracodrus* was known to occur in the pasture. The springtail population may be regarded as about normal for Britain, for a similar figure was recorded from Oxford in 1936.

DR. H. B. WEISS (3) in America published some interesting figures on the food habits of 10,000 insect species that occurred in New Jersey. Of these, he found that 48 per cent. fed upon living plant tissues, 16 per cent. were predators, 12 per cent. parasites, 17 per cent. scavengers, 3 per cent. parasites of animals, 2 per cent. pollen feeders and about 2 per cent. of unknown and presumably unimportant habit. If the classes of insects living in the soil at various times have anything approaching this relationship to each other it would indicate that about half are plant feeders and are possibly harmful but the other half are constituted largely of parasites, predators and scavengers. The gardener needs the services of the scavengers, the parasites and the predators, and many of the plant feeders may live upon weeds and, by helping to check them, earn the title of beneficial insects.

From such evidence as we have, we can only conclude that the bulk of soil insects are beneficial rather than the reverse, and that when we make use of potent and persistent soil insecticides, we risk serious disturbance of a biological balance which keeps harmful species at a moderately low level while ensuring that those processes in the soil that depend upon the activities of beneficial species are adequately maintained. It seems likely that by the careful and regular use of organic wastes or composts, by judicious use of irrigation, and the intelligent and timely use of non-persistent insecticides when necessary, even the market-gardener can keep his soil in good heart and the soil creatures working for him rather than against him. Even if we cannot go as far as WILLIAM COWPER who wrote "An inadvertent step may crush the snail that crawls at evening in the public path, Yet he that has humanity, forewarned, will tread aside and let the creature live," we might well



Photo, J. E. Downward

THE REGINALD CORY MEMORIAL CUP, 1955

FIG. 34—*Lilium* 'Edith Cecilia' raised at the University of Saskatchewan, Canada, under the direction of PROFESSOR C. F. PATTERSON, B.S.A., Ph.D., Head of the Department of Horticulture (See p. 63 of February JOURNAL)

FIG. 35—A fine plant of *Epiphyllum oxypetalum* grown by MR. A. W. MATTON
(See p. 135)

Photos, The Guernsey Press Co. Ltd.

FIGS. 36 and 37

Aeonium urbicum, an unusually fine specimen grown outside in Guernsey by MR. W. A. WARRY

(See p. 136)

AUTUMN BULBS

FIG. 38—*Colchicum speciosum* 'Huxley' (See p. 121)

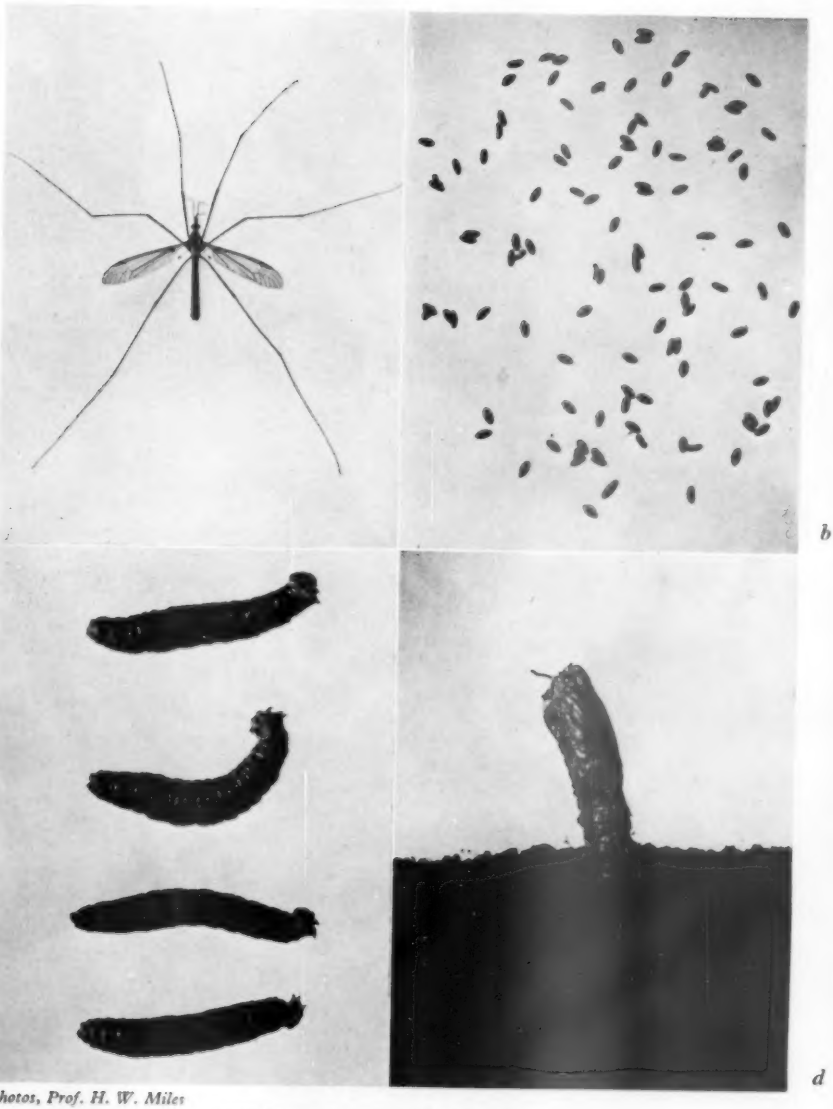
Photos, J. E. Downward

FIG. 39—*Cyclamen graecum* showing the finely marbled and velvety leaves
(See p. 122)

FIG. 40—*Leucojum autumnale* (See p. 124)

Photos, J. E. Downward

FIG. 41—*Sternbergia lutea* (See p. 126)

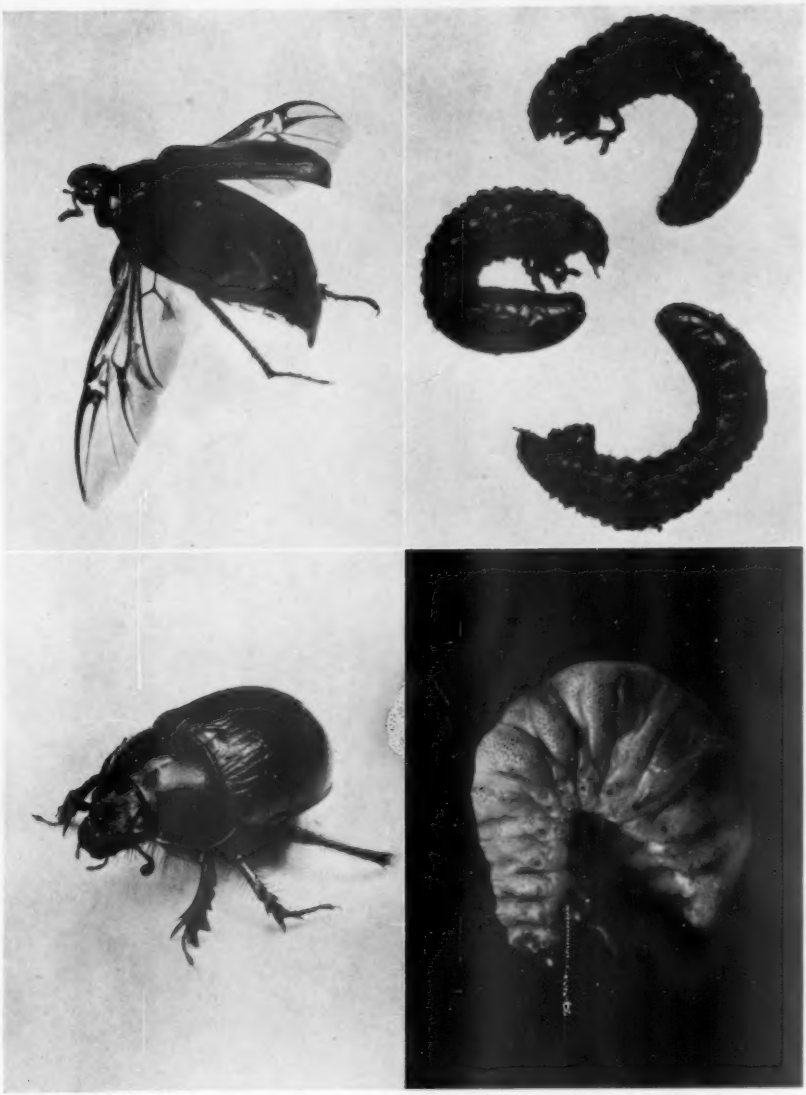


Photos, Prof. H. W. Miles

INSECT LIFE IN THE SOIL

FIG. 42—Type of insect life-history as seen in a common and familiar insect. (*a*) Crane Fly adult. (*b*) Eggs of Crane Fly. (*c*) Leatherjackets, the larval stage of Crane Fly. (*d*) Chrysalis of Crane Fly protruding from soil

(See pp. 127–128)



Photos, Prof. H. W. Miles

FIG. 43—Examples of soil insects with scavenging habits.
(*a*) Cockchafer Beetle. (*b*) White grub (the larvae of Cockchafer).
(*c*) Dor Beetle. (*d*) Grub of Dor Beetle (See pp. 128–131)

Photo, J. E. Downward

AUTUMN BULBS

FIG. 44—*Nerine* × 'Hera,' a hybrid between *N. bowdenii* and *N. curvifolia*

(See p. 125)

take the words of ALEXANDER SMITH to heart and reiterate, "Better for man were he and Nature more familiar friends," for this certainly applies to our relationship to soil insects.

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A NEW DWARF BARBERRY FROM NEPAL

Leslie W. A. Ahrendt

IN the JOURNAL for January 1956, on page 7, the very interesting narrative by W. SYKES, concerning plant collecting in Nepal, refers to a distinct new Barberry, *B. mucrifolia*. This name is derived from my MS. determinations on the relevant herbarium sheets, and is associated with a full description which should appear in due course, and which was intended to constitute both valid publication, and its first appearance. As the name has already appeared in print, it is very desirable that this earliest opportunity should be taken of providing a brief diagnosis to validate the name and typify the plant.

Berberis mucrifolia Ahrendt, sp. nov., ramulis sulcatis pubescentibus flavis, foliis parvis angustis integris mucronatis, floribus solitariis brevipedicellatis ovulis 3–5, fructibus rubris globosis, 6–7 mm; stylo 1–1·5 mm; semina atropurpurea.

NEPAL: Tegar, north of Mustang, at 14,500 feet, on steep grassy slopes, Oct. 8, 1954, *Stainton, Sykes & Williams 8111* (*Type* in Herb. Mus. Brit.). The species includes, also, their numbers *367*, *3567*, and *Polunin, Sykes & Williams'* numbers *5444*, *876*, gathered in 1952.

Combining the collectors' field notes, this is a small shrub growing from 10 inches to 2 feet high in open, exposed and dry positions on grassy and rocky hillsides. It has been introduced to cultivation through numbers 8111, 5444.

NOTES FROM FELLOWS

Epiphyllum oxypetalum

THIS night-flowering cactus is a native of tropical South America. During a visit to Sweden in the summer of 1947 I happened to spot the mother plant—as beautiful as mine is now—and I was able to secure a cutting of it. The following spring the first shoot began to grow. As

the years have gone by they have grown stronger and longer. As an example of the vitality of the plant, on February 22, 1953, I noticed the beginning of a new growth, which by September had reached 6 feet and by the beginning of February 1954 7 feet 4 inches, when I had to shorten it by 16 inches. There are now four main stems about ¾ inch thick, from which grow further long shoots with large leaves.

This spring it was repotted for the second time in an 11-inch pot, using, on advice from Kew Gardens, 1 part loam, 1 peat, 1 leaf-mould and ½ silver sand. No doubt in its native surroundings it grows under trees or the like for support and where it is dampish as it takes a lot of water.

The plant has now flowered for several years. Last year there were fourteen flowers, the first in July, a few at a time at four-week intervals, finishing in October. This year there have been forty flowers beginning in the middle of July with fourteen, at the end of August with twelve and in the third week of October with fourteen, taking four nights. On the first night one, on the second five, on the third six, and on the fourth two. The buds before opening are light brownish-red in colour. The flowers are about 8 to 9 inches across, of light creamy colour, and they are about 13 inches long from where grown out of the leaves! Stamens and pistils pure white and of an overpowering scent of almond. Next morning they hang down finished! (Fig. 35).

A. W. MATTON

Aeonium urbicum

In this country *Aeoniums* are usually grown as cool greenhouse plants, although the pots may be plunged outside during the summer. The attached photographs (Figs. 36, 37), however, show an unusually fine specimen which has been grown outside in Guernsey ever since it was planted out as a small plant. Although the usual colour of the inflorescence is given as greenish-white to pale pink, in this plant the flowers were golden in colour with a slight tinge of light green at the base of each floret. The illustration shows the unusual shape and form of the inflorescence which sometimes reaches up to 2½ feet in height and as much as 1½ feet across.

A. urbicum is an unbranching, perennial member of the *Crassulaceae* family and a native of the Canary Islands. This species is believed to have been introduced into this country in 1816. The leaves, which are 5–7 inches long and ½–1 inch wide, are formed in a dense rosette just below the inflorescence and in texture they are glabrous and may be green or glaucous with a red edge.

W. A. WARRY

La Ville au Roi,
St. Peter Port,
Guernsey, C.I.

PLANTS AND PROBLEMS—XXII

PLANTING A WINDBREAK

Question. Can you give me some guidance on planting an evergreen screen of *Thuja plicata* on a rough piece of ground? Last year I planted part of the screen and although the nurseryman supplied me with good plants all except three of them died off. I live in an open, windy position near Newbury, and I want a stout screen that will serve as a really good windbreak.

Answer. *Thuja plicata* makes a first-class windbreak, but like any other evergreen tree used for this purpose, care must be taken with the planting. In the first place the ground must be dug and perennial weeds removed and any available compost or leaf-mould incorporated. When trees are planted in exposed positions it will also be necessary to erect some temporary shelter from the wind if the screen is to make a good start. Such shelter can be obtained from a fence of wattle hurdles such as those used for sheep at lambing time. The actual planting can be done in the early autumn or left until the early spring. After planting, the trees must be well firmed by stamping on the ground vigorously and, what is of paramount importance, the soil must be kept moist throughout the following spring and summer until the roots are firmly established. Many gardeners take a lot of trouble to water from a can, but this is seldom adequate, for the soil needs soaking with water from a garden hose. Finally, it should be remembered that water can be conserved in the soil to a certain extent by mulching with any sort of organic matter like compost, peat or leaf-mould.

FIGS—WINTER PRUNING

Question. I have a wall-trained fig-tree, now several years old, some of the growth on which I feel needs thinning out. Should this be done while the tree is dormant or during the summer?

Answer. A certain amount of "winter" pruning is usually necessary on figs and this is best delayed until March so that any frost-damaged wood can be cut out. At the same time where growths are overcrowded these should be thinned, cutting them right out and not shortening them. On very neglected trees such thinning is best spread over two or three years. Aim for a 9-inch to 1-foot spacing between shoots, some of which should show embryo fruits swelling their tips. Given proper treatment these should mature as ripe figs in August–September. Some summer pruning is also essential for best results.

CELERY FLY

Question. I would be grateful if you could advise on the correct treatment for celery fly. It was so bad last year that I had to dispose of the crop before its prime or there would have been no leaves left on.

Answer. There are two, or occasionally three, broods of the Celery Fly, *Philophylla heraclei* in a year. Considerable overlapping of the generations may occur so that eggs, larvae and adults may be seen at one time.

The female flies lay their eggs singly in the leaves of celery or parsnips. From these, maggots arise which burrow into the leaf where they feed and form the characteristic blister-like mines. After about a fortnight the larvae become fully fed and pupate inside the mines, or sometimes puparia may drop to the ground. The pupal stage lasts about three to four weeks except in the case of the last generation, where the pupae overwinter and adults do not emerge until the spring.

The usual recommendations include spraying with nicotine or gamma BHC at the first sign of attack on the leaves. These insecticides penetrate the mine and kill the larvae within. However, good results have been obtained by spraying earlier with DDT in order to kill the adults before egg-laying commences, but correct timing is important. Depending upon the season the adults emerge any time between April and early June, making it necessary to spray with DDT at three-weekly intervals throughout this period, to ensure that a deposit of the insecticide is always present on the leaves. In this way the most important generation, the first, should be adequately controlled, but it may be necessary to apply further sprays later against the second generation, the adults of which emerge about the end of July.

VIRUS IN WALLFLOWERS

Question. My wallflower plants have not looked well for some time and I am sending some for examination and advice.

Answer. In our opinion your wallflowers are suffering from infection by a virus, which commonly occurs on Brassicas such as cabbages and cauliflowers and also infects various ornamental plants such as stocks and wallflowers. The most obvious symptom of this virus is seen in the "breaking" of the flower colour so that in self-coloured varieties the petals show streaks or flecks of white. The blood-red kinds seem to be very susceptible and their flowers are sometimes very striped. The leaves usually, but not invariably, show a mottling of yellow-green patches and may be more or less crinkled and curled. In the case of stocks infection is often severe so that the central younger leaves become twisted and almost tubular in appearance.

This trouble is not seed-transmitted but is spread from infected plants to healthy ones by aphids. Much of the infection comes from old cabbage plant stalks and flower stems, etc., which should be destroyed when finished with. In any case wallflowers should not be raised near old cabbage beds and aphids should be controlled wherever they are likely to multiply.

WISLEY TRIALS, 1955

PERENNIAL ASTERS

Seventy-two stocks of perennial asters (Michaelmas daisies) were grown at Wisley in 1955; many of these stocks have received awards in previous years and were grown to compare with new stocks of which this year there were nine. The trial was divided into two groups, the Novi-Belgi and the Amellus. The Novi-Belgi group was propagated from tip cuttings to control wilt (*Verticillium vilmorinii*). These cuttings were taken in March, rooted in frames, and planted out on April 26, 1955. The Amellus group was propagated by splitting the old plants and replanting on April 26.

The trial was inspected by a sub-committee of Floral Committee A on September 14 and 26 and October 6, 1955, and on its recommendation the Council of the Royal Horticultural Society has made the following awards.

The number in brackets after the description of the variety was that under which it was grown in the trial.

Novi-Belgi Group

APPLE BLOSSOM. (Raised, introduced and sent by Messrs. The Old Court Nurseries Ltd., Colwall, Malvern, Worcestershire.) **A.M.** October 6, 1955. Described R.H.S. JOURNAL **80**, p. 143 (**H.C.** 1954). [41]

CHEQUERS. (Raised by R. A. Lidsey, Esq.; introduced and sent by Messrs. Gayborder Nurseries Ltd., Melbourne, Derbyshire.) **A.M.** September 26, 1955. Plant 3 feet high, compact, erect habit; flowers 2 inches diameter, semi-double, carried in a compact panicle, near Amethyst Violet (H.C.C. 35). [47]

EVENTIDE. (Raised and introduced by the late Mr. Ernest Ballard and sent by Messrs. The Old Court Nurseries Ltd.) **A.M.** September 26, 1955. Described R.H.S. JOURNAL **80**, p. 143 (**H.C.** 1954). [52]

JEAN. (Raised, introduced and sent by Messrs. E. C. Simmonds & Sons, Verulam House Nursery, St. Albans, Hertfordshire.) **A.M.** October 6, 1955. Described R.H.S. JOURNAL **75**, p. 27 (**H.C.** 1949). [56]

MARIE BALLARD. (Raised by Mr. R. W. Picton; introduced and sent by Messrs. The Old Court Nurseries Ltd.) **A.M.** September 15, 1955. Plant 4 feet high, erect, bushy habit; flowers $2\frac{1}{16}$ inches diameter, semi-double, freely carried in a compact panicle, near Veronica Violet (H.C.C. between 639/1 and 639). [61]

MISTRESS QUICKLY. (Raised, introduced and sent by Messrs. William Wood & Son Ltd., Taplow, Bucks.) **A.M.** September 15, 1955. Plant $4\frac{1}{4}$ feet high, erect, bushy habit; flowers $1\frac{5}{8}$ inches diameter, semi-double, freely carried in a fairly compact panicle, Spectrum Violet (H.C.C. 735/1). [51]

MODERATOR. (Raised, introduced and sent by Messrs. The Old Court Nurseries Ltd.) **A.M.** September 15, 1955. Plant $4\frac{1}{4}$ feet high, erect, bushy habit; flowers $2\frac{1}{16}$ inches diameter, semi-double, freely carried in a loose panicle, near Campanula Violet (H.C.C. 37/1). [46]

ORLANDO. (Raised by Mr. R. W. Picton, introduced and sent by Messrs. The Old Court Nurseries Ltd.) **A.M.** September 26, 1955. Plant 5 feet high, erect, compact habit; flowers 2 inches diameter, semi-double, freely carried in a compact panicle, Imperial Purple (H.C.C. between 33/1 and 33). [23]

PICTURE. (Raised, introduced and sent by Messrs. Baker's Nurseries Ltd., Codsall, Wolverhampton.) **A.M.** October 6, 1955. Plant 5 feet high,

erect, compact habit; flowers 2¼ inches diameter, semi-double, freely carried in compact panicle, Doge Purple (H.C.C. 732/1). [26]

LADY EVELYN DRUMMOND. (Raised by Mr. H. J. Chaplin; introduced and sent by Messrs. H. G. & P. M. Lyall, Bricket Wood, Watford, Hertfordshire.) **H.C.** October 6, 1955. Plant 5 feet high, erect, bushy habit; flowers 2 inches diameter, semi-double, freely carried in a compact panicle, near Aster Violet (H.C.C. 38/1). [53]

Amellus Group

FRIKARTII. (Introduced and sent by Messrs. T. Carlile (Loddon Nurseries) Ltd., Carlile's Corner, Twyford, Berkshire.) **F.C.C.** September 14, 1955. Plant 3¾ feet high, erect, bushy, compact habit; flowers 2¾ inches diameter, semi-double, freely carried over a long season in a loose panicle, Veronica Violet (H.C.C. 639/1 and 639). (**A.M.** 1925). [9]

BLUE KING. (Introduced and sent by Messrs. T. Carlile (Loddon Nurseries) Ltd.) **A.M.** September 15, 1955. Plant 2¾ feet high, erect, compact habit; flowers 2½ inches diameter, semi-double, freely carried in a compact panicle, near Aster Violet (H.C.C. between 38/1 and 38). [13]

BRILLIANT. (Introduced and sent by Messrs. T. Carlile (Loddon Nurseries) Ltd.) **A.M.** September 26, 1955. Plant 3 feet high, erect, compact habit; flowers 2 1/10 inches diameter, semi-double, freely carried in a compact panicle, near Bishop's Violet (H.C.C. 34/2). [5]

FRIKARTII ROBINSONII. (Introduced and sent by Messrs. T. Carlile (Loddon Nurseries) Ltd.) **A.M.** September 26, 1955. Plant 3 feet high, erect, bushy, compact habit; flowers 2⅜ inches diameter, semi-double, freely carried over long season in a loose panicle, Veronica Violet (H.C.C. between 639/1 and 639). [17]

BEGONIAS

Thirty-five stocks of varieties of *Begonia semperflorens* were received in 1955 for trial at Wisley. The trial was sown on February 3, 1955 in seed pans containing John Innes seed compost. The seedlings were pricked off into boxes containing John Innes potting compost on April 4; 48 seedlings were placed in each box. The plants were grown on in a warm glasshouse until mid-May, when the boxes were removed to a cold-frame for hardening off. The trial was planted on May 31, each plant being set out 18 inches from its neighbour.

The trial was inspected by a sub-committee of the Floral Committee A on August 8, 12, and 19, 1955, and on its recommendation the Council of the Royal Horticultural Society has made the following awards.

The number in brackets after the description of the variety was that under which it was grown in the trial.

Varieties of Begonia semperflorens

ROSE PEARL. (Raised, introduced and sent by Messrs. Watkins & Simpson Ltd., 26-29 Drury Lane, Covent Garden, London, W.C.2.) **A.M.** August 19, 1955. Plant 18 inches high, erect, bushy, compact; leaves 3¾ inches long, 3⅜ inches wide, shiny medium green; flowers 2 inches across, 1½ inches long, single, Phlox Pink (H.C.C. between 625/2 and 625/1), buds Rose Bengal (H.C.C. 25). [7]

LUCIFER. (Raised, introduced and sent by Messrs. Watkins & Simpson Ltd.) **H.C.** August 19, 1955. Plant 14 inches high, erect, bushy, compact;

leaves 3½ inches long, 3½ inches wide, some green, some reddish brown; flowers 1½ inches across, 1⅝ inches long, single, Turkey Red (H.C.C. 721). [11]

Varieties of Begonia semperflorens gracilis

BELLA. (Raised, introduced and sent by Messrs. L. Daehnfeldt Ltd., 75 Vestergade, Odense, Denmark.) **F.C.C.** August 12, 1955. Plant 12 inches high, erect, bushy, compact; leaves 2½ inches long, 2½ inches wide, shiny medium green; flowers 1⅜ inches across, 1⅜ inches long, single, Tyrian Rose (H.C.C. 24/1), buds slightly deeper colour near Tyrian Rose (H.C.C. 24). [18]

BENARY'S LUCIFER. (Raised, introduced and sent by Messrs. E. Benary, Hann-Münden, Germany.) **A.M.** August 12, 1955. Plant 12 inches high, erect, open habit; leaves 2¼ inches long, 3 inches wide, shiny reddish-bronze; flowers 1¼ inches across, 1⅜ inches long, single, Scarlet (H.C.C. 19/1). [33]

DAZZLER. (Raised, introduced and sent by Messrs. N. V. Sluis en Groot, Enkhuizen, Holland.) **A.M.** August 19, 1955. Plant 7½ inches high, dwarf, bushy, very compact; leaves 2 inches long, 2 inches wide, light reddish-green, edges tinged with red; flower $\frac{9}{10}$ inch across, $1\frac{1}{10}$ inches long, single, Turkey Red (H.C.C. 721). [22]

INDIAN MAID. (Raised, introduced and sent by Messrs. L. Clause S.A., Bretigny-sur-Orge (S. et O.), France.) **A.M.** August 5, 1955. Plant 12 inches high, erect, bushy, compact; leaves 2¼ inches long, 2½ inches wide, shiny dark reddish-brown; flower 1⅛ inches across, 1⅜ inches long, single, Turkey Red (H.C.C. 721/1). [9]

PINK PROFUSION. (Raised, introduced and sent by Messrs. E. Benary.) **A.M.** August 19, 1955. Plant 14 inches high, erect open habit; leaves 2 inches long, 2 inches across, shiny medium green, edges red; flower 1⅜ inches across, 1⅛ inches long, single, opening Neyron Rose (H.C.C. 623), fading when fully open to Neyron Rose (H.C.C. 623/2). [5]

RED PERFECTION. (Raised, introduced and sent by Messrs. Erfurter, Niederwalluf/Rhg, Germany.) **A.M.** August 12, 1955. Plant 12 inches high, erect, bushy habit; leaves 2⅛ inches long, 2⅛ inches across, shiny medium green tinged reddish-bronze; flower 1⅜ inches across, 1½ inches long, single, Turkey Red (H.C.C. 721). [30]

ROTE TAUSENDSCHOEN. (Raised, introduced and sent by Messrs. E. Benary.) **A.M.** August 5, 1955. Plant 9 inches high, erect, bushy, compact; leaves 1¾ inches long, 2½ inches wide, shiny medium green tinged with reddish-brown; flower 1⅛ inches across, 1⅜ inches long, single, Turkey Red (H.C.C. 721). [23]

GOTHAER KIND. (Raised, introduced and sent by Messrs. Erfurter.) **H.C.** August 12, 1955. Plant 12 inches high, erect, compact; leaves 2¾ inches long, 3 inches wide, some leaves green, some leaves dark greenish-red; flower 1½ inches across, 1⅝ inches long, single, Turkey Red (H.C.C. 721/1). [10]

RED PERFECTION. (Raised by Mr. D. Kaufmann; introduced and sent by Messrs. Samen-Mauser, Rathausbrucke, Zurich, Switzerland.) **H.C.** August 5, 1955. Plant 10 inches high, erect, bushy, compact; leaves 2¼ inches long, 2 inches wide, shiny medium green tinged reddish-brown; flowers 1⅛ inches across, 1½ inches long, single, Turkey Red (H.C.C. 721/3). [31]

ROSE PERFECTION. (Raised, introduced and sent by Messrs. Erfurter.) **H.C.** August 5, 1955. Plant 9 inches high, bushy, compact; leaves 2 inches long, 2 inches wide, shiny medium green; flowers 1¼ inches across,

1½ inches long, single, Rose Madder (H.C.C. between 23/2 and 23/1), buds Rose Madder (H.C.C. 23). [16]

SLEEPING BEAUTY. (Raised, introduced and sent by Messrs. E. Benary.) **H.C.** August 19, 1955. Plant 12 inches high, erect, bushy, compact; leaves 2 inches long, 2 inches wide, medium green, edges tinged with red; flowers 1 3/10 inches across, 1½ inches long, single, Tyrian Rose (H.C.C. 24/1), buds Rose Opal (H.C.C. 022). [19]

SNOWBANK. (Introduced by Mr. Geo. J. Ball, West Chicago, U.S.A. and sent by Messrs. N. V. Sluis en Groot.) **H.C.** August 5, 1955. Plant 12 inches high, erect, bushy, compact; leaves 2½ inches long, 2 inches wide, shiny medium green; flowers 1⅛ inches across, 1½ inches long, single, white; stamens yellow. [3]

STUTTGART. (Raised, introduced and sent by Messrs. E. Benary.) **H.C.** August 19, 1955. Plant 12 inches high, fairly compact; leaves 2 inches long, 2½ inches wide, dark greenish-brown; flower 1⅝ inches across, 1½ inches long, single, Tyrian Rose (H.C.C. 24/1), buds Crimson (H.C.C. 22). [14]

THOUSAND WONDERS. (Raised, introduced and sent by Messrs. E. Benary.) **H.C.** August 5, 1955. Plant 10 inches high, erect, bushy, compact; leaves 2⅛ inches long, 2⅛ inches wide, shiny medium green, edges tinged with red; flowers 1⅛ inches across, 9/10 inch long, single, Tyrian Rose (H.C.C. 24/1), buds Tyrian Rose (H.C.C. 24). [12]

COSMOS

Thirteen stocks of cosmos were received in 1955 for trial at Wisley. The seed was sown on April 20, 1955, in shallow drills 15 inches apart. The young seedlings were thinned and the taller plants supported by hazel sticks. The trial was divided into two groups, the Klondyke group and the Sensation group.

The trial was inspected by a sub-committee of Floral Committee A on July 28, August 5 and 19, 1955, and on its recommendation the Council of the Royal Horticultural Society has made the following awards.

The number in brackets after the description of the variety was that under which it was grown in the trial.

Klondyke Group

ORANGE FLARE. (Sent by Messrs. Watkins & Simpson Ltd., 26-29 Drury Lane, Covent Garden, London, W.C.2.) **A.M.** August 19, 1955. Plant 30 inches high, erect, compact, much branched; flowers 2⅝ inches diameter, single, very freely produced; ray florets 1 1/10 inches long, ⅝ inch wide, channelled, tips slightly serrated, a vivid orange much deeper and brighter than Orpiment Orange (H.C.C. 10). [5]

BURPEE PRIMROSE. (Raised, introduced and sent by Messrs. W. Atlee Burpee Co., Hunting Park Avenue, Philadelphia 32, U.S.A.) **H.C.** August 19, 1955. Plant 36 inches high, erect, compact, much branched; flowers 2⅝ inches diameter, single, very freely produced; ray florets 1 1/10 inches long, ½ inch wide, channelled, tips slightly serrated, a clear shade of yellow near Sulphur Yellow (H.C.C. 1). [1]

Sensation Group

GLORIA. (Sent by Messrs. Watkins & Simpson Ltd.) **H.C.** July 28, 1955. Plant 60 inches high, erect, much branched; flowers 4½ inches diameter, single, very freely produced; ray florets 2 inches long, 1¾ inches wide,

channelled, edges crenate, Cyclamen Purple (H.C.C. between 30/3 and 30/2). [10]

PINKIE. (Raised, introduced and sent by Messrs. Ferry-Morse Seed Co., Mountain View, California, U.S.A.) **H.C.** August 5, 1955. Plant 66 inches high, erect, much branched; flowers 4¾ inches diameter, single, very freely produced; ray florets 2½ inches long, 1½ inches wide, channelled, edges crenate, Phlox Purple (H.C.C. 632/2). [8]

VERSAILLES. (Raised, introduced and sent by Messrs. Vilmorin Andrieux & Co., 4 Quai de la Megisserie, Paris, France.) **H.C.** August 5, 1955. Plant 54 inches high, erect, much branched ; flowers 4½ inches diameter, single, freely produced; ray florets 2 inches long, 1¼ inches wide, finely fluted, edges crenate, Orchid Purple (H.C.C. 31/2) deepening at base of petal to Dianthus Purple (H.C.C. 730), distinct yellow disc. [13]

GLADIOLI

One hundred and seventy-four stocks of gladioli were grown at Wisley in the trials during 1955. Twelve corms of each stock were planted on April 15, 1955. The trial was inspected on July 19 and 28 and August 5, 12 and 19, 1955 by a sub-committee of the Floral Committee A and on its recommendation the Council of the Royal Horticultural Society has made the following awards to gladioli.

The number in brackets after the description of the variety was that under which it was grown in the trial.

Flowers white and of cream shades

ESPERANCE. (Raised, introduced and sent by Messrs. N. V. Konynenburg & Mark, Noordwyk, Holland.) **F.C.C.** August 12, 1955. Described R.H.S. JOURNAL 78, p. 32 (**A.M.** 1952). [7]

LEIF ERIKSON. (Raised, introduced and sent by Messrs. N. V. Konynenburg & Mark.) **F.C.C.** August 12, 1955. Described R.H.S. JOURNAL, 77, p. 184 (**A.M.** 1951). [15]

GENOVEVA. (Raised, introduced and sent by Messrs. N. V. Konynenburg & Mark.) **A.M.** August 5, 1955. Plant 60 inches tall; twenty-one flowers per spike with nine open at once. Flowers 4⅝ inches diameter, cream with blotch at throat of Naples Yellow (H.C.C. 403/3). [12]

HUDSON. (Raised, introduced and sent by Messrs. P. Visser Cz., St. Pancras, Holland.) **A.M.** August 19, 1955. Plant 48 inches tall; twenty flowers per spike with seven open at once. Flowers 5 inches diameter, cream with blotch at throat of Scarlet (H.C.C. 19/1). [17]

ANECDOTE. (Raised, introduced and sent by Messrs. N. V. Konynenburg & Mark.) **H.C.** July 28, 1955. Plant 54 inches tall; eighteen flowers per spike with six open at once. Flowers 4½ inches diameter, Primrose Yellow (H.C.C. 601/3), lower petals at throat Straw Yellow (H.C.C. 604). [156]

GOOD LUCK. (Raised, introduced and sent by Messrs. N. V. Konynenburg & Mark.) **H.C.** August 12, 1955. Plant 54 inches tall; twenty flowers per spike with seven open at once. Flowers 4¾ inches diameter, white with blotch at throat of Geranium Lake (H.C.C. 20). [18]

FLYING WING. (Raised, introduced and sent by Messrs. P. Visser Cz.) **H.C.** August 5, 1955. Plant 54 inches tall; eighteen flowers per spike with seven open at once. Flowers 4¾ inches diameter, white, throat creamy-yellow. [2]

RUDYARD KIPLING. (Raised, introduced and sent by Messrs. N. V. Konynenburg & Mark.) **H.C.** August 19, 1955. Plant 54 inches tall; nineteen flowers per spike with eight open at once. Flowers $3\frac{1}{2}$ inches diameter, white, throat flushed with Neyron Rose (H.C.C. 623/2) and blotched with Scarlet (H.C.C. 19). [20]

WHITE CITY. (Raised, introduced and sent by Messrs. P. Visser Cz.) **H.C.** July 28, 1955. Plant 63 inches tall; twenty-one flowers per spike with eight open at once. Flowers $4\frac{3}{4}$ inches diameter, creamy-white, throat pale yellow. [13]

Flowers of yellow shades

ARES. (Raised, introduced and sent by Messrs. N. V. Konynenburg & Mark.) **F.C.C.** August 5, 1955. Described R.H.S. JOURNAL **77**, p. 184 (**H.C.** 1951, **A.M.** 1953). [36]

FLOWERSONG. (Raised, introduced and sent by Messrs. N. V. Konynenburg & Mark.) **F.C.C.** August 19, 1955. Plant 60 inches tall; twenty-three flowers per spike with seven open at once. Flowers $4\frac{3}{16}$ inches diameter, Sulphur Yellow (H.C.C. 1/1). [30]

FULDA. (Raised, introduced and sent by Messrs. N. V. Konynenburg & Mark.) **A.M.** August 12, 1955. Described R.H.S. JOURNAL **80**, page 237 (**H.C.** 1954). [34]

Flowers of orange shades

SUNNY. (Raised, introduced and sent by Messrs. N. V. Konynenburg & Mark.) **A.M.** August 19, 1955. Plant 54 inches tall; twenty flowers per spike with six open at once. Flowers $3\frac{3}{4}$ inches diameter, Orange Buff (H.C.C. 507/2) flushed and splashed Azalea Pink (H.C.C. 618), lower petals with blotch at throat of Poppy Red (H.C.C. 16) with a purple stripe in the centre of blotch. [157]

Flowers of pink shades

FATA MORGANA. (Raised, introduced and sent by Messrs. N. V. Konynenburg & Mark.) **A.M.** August 5, 1955. Plant 60 inches tall; twenty-one flowers per spike with seven open at once. Flowers $4\frac{1}{2}$ inches diameter, Porcelain Rose (H.C.C. 620/1) with edges of petals slightly splashed with Porcelain Rose (H.C.C. 620), lower petals with blotch at throat of Straw Yellow (H.C.C. between 604/1 and 604). [97]

ANNA REGINA. (Raised, introduced and sent by Messrs. N. V. Konynenburg & Mark.) **H.C.** August 5, 1955. Plant 54 inches tall; twenty-one flowers per spike with eight open at once. Flowers 5 inches diameter, a clear shade of pink near French Rose (H.C.C. 520/1) with blotch at throat of Straw Yellow (H.C.C. 604/2). [102]

BALALAIKA. (Raised, introduced and sent by Messrs. N. V. Konynenburg & Mark.) **H.C.** August 5, 1955. Plant 60 inches tall; twenty-one flowers per spike with six open at once. Flowers $4\frac{7}{16}$ inches diameter, Porcelain Rose (H.C.C. 620) splashed Vermilion (H.C.C. 18) with a creamy-yellow streak at throat. [98]

BENGALEN. (Raised, introduced and sent by Messrs. N. V. Konynenburg & Mark.) **H.C.** July 28, 1955. Plant 56 inches tall; seventeen flowers per spike with five open at once. Flowers $4\frac{1}{4}$ inches diameter, Chinese Coral (H.C.C. 614/3) deepening at tips of petals to Chinese Coral (H.C.C. 614/2) with blotch at throat of Ruby Red (H.C.C. 827/3) ringed with Chrome Yellow (H.C.C. 605/1). [48]

SUMMERTIMES. (Raised, introduced and sent by Messrs. N. V. Konynenburg & Mark.) **H.C.** August 5, 1955. Plant 60 inches tall; twenty-three flowers per spike with six open at once. Flowers 3¾ inches diameter, Begonia (H.C.C. 619/2) splashed with Begonia (H.C.C. 619), small blotch at throat of Poppy Red (H.C.C. 16/1) flushed with amber. [78]

Flowers of red shades

ATLANTIC. (Raised, introduced and sent by Messrs. Blom & Padding, Beverwijk, Holland.) **F.C.C.** August 12, 1955. Described R.H.S. JOURNAL **75,** p. 34 (**A.M.** 1949). [60]

ALFRED NOBEL. (Raised by Messrs. H. J. Salman & Sons, introduced and sent by Messrs. P. de Jager & Sons, Heiloo, Haarlem, Holland.) **A.M.** August 19, 1955. Described R.H.S. JOURNAL **79,** p. 100 (**H.C.** 1953). [96]

CASWALLOWN. (Raised, introduced and sent by Messrs. N. V. Konynenburg & Mark.) **A.M.** August 5, 1955. Described R.H.S. JOURNAL **74,** p. 32 (**H.C.** 1948). [85]

GYPSY LOVE. (Raised, introduced and sent by Messrs. N. V. Konynenburg & Mark.) **A.M.** August 5, 1955. Plant 54 inches tall; twenty-one flowers per spike with seven open at once. Flowers 3¾ inches diameter, Poppy Red (H.C.C. 16/1) slightly paler towards throat, blotch at throat of Dutch Vermilion (H.C.C. 717). [167]

LIFE FLAME. (Raised, introduced and sent by Messrs. N. V. Konynenburg & Mark.) **A.M.** July 19, 1955. Plant 54 inches tall; seventeen flowers per spike with seven open at once. Flowers 5¾ inches diameter, a vivid red near Vermilion (H.C.C. 18) with slight creamy-yellow streak at throat. [109]

VOLCANO. (Raised, introduced and sent by Messrs. P. Visser Cz.) **A.M.** August 19, 1955. Described R.H.S. JOURNAL **80,** p. 238 (**H.C.** 1954). [63]

WINSTON CHURCHILL. (Raised by Messrs. H. J. Salman & Sons; introduced and sent by Messrs. P. de Jager & Sons.) **A.M.** August 12, 1955. Described R.H.S. JOURNAL **78,** page 37 (**H.C.** 1952). [80]

RENDEZVOUS. (Raised, introduced and sent by Messrs. N. V. Konynenburg & Mark.) **H.C.** August 12, 1955. Plant 60 inches tall; twenty-one flowers per spike with four open at once. Flowers 3⅝ inches diameter, Poppy Red (H.C.C. 16/1) splashed Poppy Red (H.C.C. 16) with blotch at throat of Mandarin Red (H.C.C. 17). [169]

Flowers of mauve and purple shades

KEUKENHOF. (Raised, introduced and sent by Messrs. P. Visser Cz.) **F.C.C.** August 19, 1955. Described R.H.S. JOURNAL **80,** p. 238 (**A.M.** 1954). [114]

REVEIL. (Raised, introduced and sent by Messrs. N. V. Konynenburg & Mark.) **A.M.** July 28, 1955. Plant 51 inches tall; twenty flowers per spike with six open at once. Flowers 4¾ inches diameter, Magenta (H.C.C. 27/1) slightly paler towards throat, with blotch at throat of creamy yellow. [134]

DREAM GIRL. (Raised by Messrs. H. J. Salman & Sons; introduced and sent by Messrs. P. de Jager & Sons.) **H.C.** July 28, 1955. Plant 54 inches tall; nineteen flowers per spike with six open at once. Flowers 5¼ inches diameter, Roseine Purple (H.C.C. 629/1) with blotch at throat of Fuchsia Purple (H.C.C. 28). [120]

PRESTO. (Raised, introduced and sent by Messrs. N. V. Konynenburg & Mark.) **H.C.** July 28, 1955. Plant 51 inches tall; twenty-three flowers per

spike with six open at once. Flowers 4¾ inches diameter, Roseine Purple (H.C.C. 629/2) deepening at tips of petals to Roseine Purple (H.C.C. 629), faint blotch at throat of creamy-yellow. [121]

Flowers of blue-violet shades

BLUE GODDESS. (Raised, introduced and sent by Messrs. N. V. Konynenburg & Mark.) **H.C.** August 5, 1955. Plant 60 inches tall; eighteen flowers per spike with six open at once. Flowers 4 inches diameter, Campanula Violet (H.C.C. 37/3) mottled at centre of petals Campanula Violet (H.C.C. 37/1), mottling getting darker towards tips of the petals, where it is Plum Purple (H.C.C. 934/3). [140]

DISTINCTION. (Raised, introduced and sent by Messrs. Blom & Padding.) **H.C.** August 19, 1955. Plant 52 inches tall; nineteen flowers per spike with four open at once. Flowers 4½ inches diameter, Pastel Lilac (H.C.C. 437/3) changing at edges of petals to Violet (H.C.C. 36/2) with blotch at throat of Violet (H.C.C. 36/1) surrounded by a creamy yellow stripe. [148]

The following awards have been made after trial at Wisley.

IRIS MONSPUR 'DOROTHY FOSTER.' (Sent by Messrs. Perry's Hardy Plant Farm, Enfield, Middlesex.) **H.C.** June 29, 1955. Foliage 40 inches high, green; flower stem 42 inches long, erect, four flowers per stem; flower well proportioned, open; standard, 2¼ inches long, ⅝ inch wide, upright, erect, spathulate, Sea Lavender Violet (H.C.C. 637/1); falls 2¾ inches long, 1¼ inches wide, horizontal, long spathulate, margins Wistaria Blue (H.C.C. 640/2) veined Wistaria Blue (H.C.C. 640/1), centre white ground heavily veined Phlox Purple (H.C.C. 632/1) with streak along midrib of Aureolin (H.C.C. 3).

LATHYRUS LATIFOLIUS 'WHITE PEARL.' (Sent by Messrs. T. Carlile (Loddon Nurseries) Ltd., Carlile's Corner, Twyford, Berkshire.) **F.C.C.** July 28, 1955. Plant 6 feet high, 4 feet spread, very floriferous; flower stem 9 inches long, slender, rigid, eight to twelve flowers per stem; flowers 1½ inches diameter, 1 1/16 inches long; pure white veined cream at the base of the standard; buds cream.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1955

Begonia 'Emily Clibran' A.M. November 15, 1955, as a greenhouse flowering plant. A well-known winter-flowering hybrid variety with orange-salmon double flowers measuring 2¼ inches across and deepening in colour towards the margins. Shown by Hugh W. Astor, Esq. (Gr. Mr. J. L. Jones), Folly Farm, Gulhamstead, nr. Reading.

Begonia 'Van der Meer's Glory' A.M. November 15, 1955, as a greenhouse flowering plant. A Dutch-raised winter-flowering hybrid variety of good habit with large single orange-flame flowers measuring 2½ to 2¾ inches across. Shown by Hugh W. Astor, Esq. (Gr. Mr. J. L. Jones), Folly Farm, Gulhamstead, nr. Reading.

Bouvardia 'Giant Pink' A.M. November 29, 1955. A graceful flowering plant for the cool greenhouse. It has finely downy growths reaching a height of 2½ feet, bearing ovate, acute leaves 4 inches long, often in whorls of three; and terminal panicles of Carmine Rose (H.C.C. 621) flowers. The corolla has a narrow tube ¾ inch long and a spreading four-parted limb 1 inch across. Exhibited by The Director, John Innes Horticultural Institution, Bayfordbury, Herts.

Sorbus hupehensis A.M. November 29, 1955. A hardy tree native to Western China. The branches exhibited were heavily laden with lax drooping panicles of ovoid white berries ⅓ inch long on ruby-tinted stalks. The leaves, which are made up of from thirteen to seventeen elliptic leaflets, and often colour well in the autumn, had already fallen from the specimens. Exhibited by the Commissioners of Crown Lands, Windsor Great Park, Berks.

Sparmannia africana A.M. November 29, 1955. This decorative Cape shrub is capable of reaching a height of 20 feet, but it will flower freely when much smaller, and it is easily grown in the cool greenhouse or even in a living room. It has softly hairy, cordate, slender-pointed leaves 5 inches long, and flowers in large, long-stalked umbels. The individual bloom is 1½ inches across, with four spreading, obovate, white petals and a central boss of red and yellow stamens. The species is beautifully figured in the *Botanical Magazine* of 1801 (t. 516). Exhibited by The Director, Royal Botanic Gardens, Kew.

Lilium 'Dark Princess.' The correct name of the lily to which an Award of Merit was given on July 12, 1955, under the name 'Beltsville Tiger' is 'Dark Princess.' This attractive hybrid, which was described on page 528 of the JOURNAL for November, 1955, was raised at Beltsville, Maryland, U.S.A., by crossing a hybrid between *wallacei* and *batemanniae* with the triploid form of *tigrinum*. The mistake arose through the interchanging of the labels of two bulbs in transit from the U.S.A.

ORCHID

× **Odontioda (Elpheon G.) 'Lyoth Emperor' A.M.** November 1, 1955. A very dark-coloured cultivar obtained by crossing × *Odontioda* (A. G. Ellwood G.) 'Mecca,' with *Odontoglossum* 'Opheon.' Seven flowers were borne on the spike exhibited, individual blooms being nearly 4 inches by 3½ inches. The basic colour is a dark purple maroon with blotches of pale mauve especially prominent towards the margin. The tepals have recurved apices and the white apex of the labellum is strongly fimbriated. The area around the crest is suffused with yellow. Exhibited by Messrs. Charlesworth & Co., Ltd., Haywards Heath, Sussex.

LATE-FLOWERING CHRYSANTHEMUMS

The Royal Horticultural Society and the National Chrysanthemum Society have made jointly the following awards to late-flowering chrysanthemums after exhibition at the Shows of the Royal Horticultural Society and the National Chrysanthemum Society on the recommendation of the Joint Chrysanthemum Committee.

Chrysanthemum 'Charles Shoesmith' F.C.C. October 18, 1955, as a variety for show purposes. Section 11, Large Exhibition, light bronze. Flowers 11 inches diameter, 7¾ inches deep; florets very long, very broad, outer florets Empire Yellow (H.C.C. 603/1) slightly flushed apricot, inner florets Empire Yellow (H.C.C. 603). Shown by Messrs. K. Luxford Ltd., Sawbridgeworth, Herts.

Chrysanthemum 'Constellation' A.M. November 15, 1955, as a spray variety for show purposes and for cutting for market. Section V, Reflexed Decorative, spray, yellow. Flowers 2½ inches diameter; florets medium length, broad, Aureolin (H.C.C. 3). Shown by Messrs. R. H. Bath Ltd., The Floral Farms, Wisbech, Cambridgeshire.

Chrysanthemum 'Denebola' A.M. November 15, 1955, as a variety for show purposes. Section VII, anemone-flowered, medium-flowered, pink. Flowers 4½ inches diameter; ray florets short, broad, Mallow Purple (H.C.C. 630/3); disc 2¾ inches diameter, disc florets tubular, Mallow Purple (H.C.C. 630/3) tipped yellow. Shown by Messrs. R. H. Bath Ltd.

Chrysanthemum 'Desirable' A.M. November 15, 1955, as a variety for show purposes. Section V, Reflexed Decorative, pink. Flowers 5 inches diameter; florets medium length and width, slightly quilled, a delicate shade of Phlox Pink (H.C.C. 625/3), inner florets tinged with greenish-yellow, reverse creamy-yellow. Shown by Messrs. A. G. Vinten Ltd., Oldland Nurseries, Balcombe, Sussex.

Chrysanthemum 'Galaxy' F.C.C. December 13, 1955, as a spray variety for cutting for market. Section IX, single, small-flowered, bronze. Described R.H.S. JOURNAL **80,** 243 (**A.M.** 1954). Shown by Messrs. Colham Green Nurseries Ltd., Hillingdon, Middlesex.

Chrysanthemum 'Golden Balcombe Perfection' F.C.C. November 15, 1955, as a variety for show purposes and for cutting for market. Section VI, Incurving Decorative, yellow. Described R.H.S. JOURNAL **80,** 243 (**A.M.** 1954). Shown by Messrs. Colham Green Nurseries Ltd.

Chrysanthemum 'Grandpa Thompson' A.M. December 13, 1955, as a variety for cutting for market. Section V, Reflexed Decorative, red. Flowers 5¼ inches diameter; florets long broad, deep velvety crimson, reverse bronze. Shown by Messrs. G. Thompson & Sons (Nurseries) Ltd., 237 Sutton Common Road, Sutton, Surrey.

Chrysanthemum 'Incurving Marie Morin' A.M. November 15, 1955, as a variety for show purposes. Section VI, Incurving Decorative, white. Flowers 5¼ inches diameter; florets medium length and width, channelled, tips notched, white, outer florets tinged pink. Shown by Mr. D. Baldwin, Longcroft Nurseries, Laycock, Keighley, Yorkshire.

Chrysanthemum 'Incurving Yellow Morin' A.M. November 15, 1955, as a variety for show purposes. Section VI, Incurving Decorative, yellow. Flowers 5¾ inches diameter; florets long, broad, channelled, tips notched, Lemon Yellow (H.C.C. 4) reverse slightly paler. Shown by Mr. D. Baldwin.

Chrysanthemum 'Jean Ricardo' F.C.C. October 18, 1955, as a variety for show purposes. Section IV, Medium Exhibition, light bronze. Flowers 7½ inches diameter; florets very long, very broad, channelled, pale creamy yellow flushed with Poppy Red (H.C.C. 16/3), reverse Empire Yellow (H.C.C. 603/1). Shown by Messrs. K. Luxford Ltd.

Chrysanthemum 'John Maher' A.M. November 29, 1955, as a variety for show purposes and for cutting for market. Section V, Reflexed Decorative, pale pink. Flowers 6¼ inches diameter; florets long, broad, quilled, a delicate shade of pink near Rhodamine Pink (H.C.C. 527/3). Shown by Messrs. J. & E. Maher, Carisbrooke Nurseries, South Road, Oak Avenue, Hampton, Middlesex.

Chrysanthemum 'Merrymaker' A.M. December 13, 1955, as a spray variety for cutting for market. Section IX, Single, small-flowered, red. Flowers 3 1/10 inches diameter; ray florets medium length, broad, flat, bright chestnut crimson, disc yellow with green centre. Shown by Messrs. Colham Green Nurseries Ltd.

Chrysanthemum 'Peggy Stevens' A.M. November 15, 1955, as a variety for show purposes. Section IX, single, large-flowered, yellow. Flowers 6½ inches diameter; ray florets long, broad, slightly channelled, Aureolin (H.C.C. between 3/1 and 3), disc yellow tinged green. Shown by Mr. Stuart Ogg, The Grove Nurseries, New Barn Lane, Swanley, Kent.

Chrysanthemum 'Popcorn' A.M. November 4, 1955, as a spray variety for show purposes and for cutting for market. Section VIII, Pompons, medium-flowered, pale pink. Flowers 2¼ inches diameter, florets medium length, flat, white flushed Persian Rose (H.C.C. 628/3). Shown by Messrs. R. H. Bath Ltd.

Chrysanthemum 'Portrait' A.M. November 4, 1955, as a spray variety for show purposes and for cutting for market. Section V, Reflexed Decorative, spray, pink. Flowers 3 inches diameter, medium length, broad, flat, pink near Persian Rose (H.C.C. 628/1). Shown by Messrs. Colham Green Nurseries Ltd.

Chrysanthemum 'Preference' A.M. November 15, 1955, as a variety for show purposes. Section IX, single, large-flowered, pink. Flowers 7¾ inches diameter; ray florets very long and broad, slightly quilled, Mallow Purple (H.C.C. 630/2), disc yellow and green. Shown by Messrs. Greenyer Bros. Ltd., Broadwater Green Nurseries, Worthing, Sussex.

Chrysanthemum 'Princeton' F.C.C. November 15, 1955, as a spray variety for cutting for market. Section V, Reflexed Decorative, spray, light bronze. Described R.H.S. JOURNAL **79**, 281 (**A.M.** 1953). Shown by Messrs. Colham Green Nurseries Ltd.

BOOK NOTES

"Practical Organic Gardening." By Ben Easey. 312 pp. Illus. (Faber & Faber Ltd.) 21s.

A comprehensive and authoritative work on organic gardening is long overdue. Mr. Ben Easey has covered much ground in his book, and has not overstated the case for or against organic gardening.

Those of us who have been in the actual practice of horticulture for many years, can remember when organic matter, from the stables of London, and other towns, was in such plentiful supply that all market-gardens round these areas were never short of humus, and, for vegetable-growing the value of stable manure, well composted, cannot be exaggerated. Today, because of great scarcity, we buy it like sugar, so much per pound, and it is interesting to note that this book deals exhaustively with many other materials which nowadays are wasted and could be economically composted.

The maintenance of soil fertility, combined with good soil structure, is one of our problems today, and as we look back to the days when stable manure was in plentiful supply, we were certainly much more free of pests and diseases than we are today. Fifty years ago we were growing vegetables of very high quality without having to resort to insecticides and other control methods in dealing with pests and diseases.

Chapter XI of Mr. Ben Easey's book, which deals with "Organic Surface Cultivations" may be suitable for the small amateur gardener, but it is doubtful whether these methods could be applied on intensive market-gardens where three or four crops are grown annually on the same land.

Both professional and amateur gardeners should gain much by careful study of this well-illustrated book.

F. A. SECRETT

"Flowers in Colour." By A. G. L. Hellyer. 128 pp. Illus. (W. H. & L. Collingridge Ltd.) 21s.

The value of good illustrations to the beginner who wants to get to know his plants is inestimable. Hitherto in this matter he has not been well served, for there have been few, if any, cheap books devoted to plant portraiture. Now, however, he can turn to Mr. A. G. L. Hellyer's "Flowers in Colour." In this comparatively inexpensive book Mr. Hellyer has described 1,000 species and varieties of hardy and greenhouse plants. Between two and three hundred genera are covered, and of these at least one species has a water-colour illustration prepared by Miss Cynthia Newsome-Taylor from living material. There are therefore upwards of 250 coloured illustrations of plants. Furthermore, in the margins of the text pages there are 500 wood-engravings selected from James Loudon's "Encyclopaedia of Gardening" and originally drawn by James Sowerby. I can imagine the newcomer to the world of horticulture poring over this book. If he does, he will quickly lay a good foundation for his knowledge of plants.

The coloured illustrations are very adequately reproduced. The individual drawings are displayed on the page rather in the manner of the German guides to the alpine flora, but in such a way as to make very agreeable plates. It is to be hoped that this is only the first of quite a new kind of book. Others conceivably might be devoted to individual genera.

MORTON

"Shrubs for Amateurs." By W. J. Bean. Revised by S. A. Pearce. 127 pp. Illus. (Country Life.) 15s.

I bought the first edition of this book many years ago. Like all the work of W. J. Bean, it was excellent. It is over thirty years since it was first published, and now Mr. S. A. Pearce, himself in charge of the Arboretum at Kew, has produced a third and enlarged edition. All the fundamentals of the culture of flowering shrubs are covered; there are lists of shrubs to meet special requirements, and, forming the body of the book, a descriptive list of flowering shrubs. Shrubs introduced, or which have become more readily available since the first edition, have been included, and there have been such additions and amendments to the text as more recent experience has required. Rhododendrons receive only brief mention, being rightly regarded as amply covered elsewhere.

It is impossible to overrate the value to the amateur of good illustrations, and the numerous photographs are an important feature of this book.

MORTON

"Practical Plant Protection." By E. Holmes. 252 pp. Illus. (Constable & Co., London, 1955.) 15*s*. net.

This is essentially a book for the practical grower by one who has for more than twenty years been concerned with the application of scientific knowledge to the control of pests, diseases and weeds. Dr. Holmes is a man of wide experience in the laboratory and the field and he has produced a book which is up to date, unbiased and understandable by the veriest tyro in horticultural production. Although the greater part of the book is concerned with chemical control, it begins with an excellent, if short, chapter on the importance of good husbandry in plant protection. After dealing with methods of plant protection and the chemicals and formulations used, in which the important point is stressed that small differences in formulation may have large effects on efficiency, the author treats of the pests of the different types of crops and then of their diseases. A lucid account is given of methods of weed control and of eelworm pests. Virus problems and deficiency disorders are dealt with briefly; so briefly, in fact, that these chapters are not particularly helpful.

In the welter of new chemicals, where confusion in nomenclature becomes daily greater, the layman may well feel utterly lost. Initial letters, abbreviated and mangled chemical terms, proprietary names, all without system or logic, meet the eye of the grower in every trade journal and catalogue he picks up. Dr. Holmes has provided a good guide to this labyrinth, although in this respect any book must be to some extent out of date before it is published. One seeks in vain, for instance, for reference to the new and already widely used fungicide, "captan," so recent is its introduction.

The author states that he has not attempted an exhaustive list of pests and diseases, but it is a little surprising to find no mention of cabbage root fly or of downy mildew of lettuce, to mention two rather obvious omissions. One major criticism must be made; the author has deliberately not used the scientific names of insects and fungi, and one cannot help but feel that this is a pity. It is true that Latin names tend to frighten and confuse the layman, but confusion can sometimes be much greater if they are omitted, as, for instance, with the various cankers and diebacks of fruit trees and bushes.

Nevertheless, this is a book which all growers should buy and read, and watch for new editions, which will surely be forthcoming in a subject that moves so fast.

R. H. STOUGHTON

"Diseases of Fruits and Hops." By Dr. H. Wormald. (Crosby Lockwood & Son Ltd.) 25*s*. net.

Those who welcomed Dr. Wormald's first book on the diseases which affect our fruit can have no complaint with the publishers for keeping up to date, for we now have the third revised edition, which is considerably enlarged. The work is well known and needs little description, but this edition cannot fail to arouse the interest of anyone interested in the troubles which beset our fruit crops. It deals with diseases of fruit and hops, the latter, however, occupying only about twenty pages out of a total of over 300. For the rest we find every chapter brought up to date and giving the latest information. It is most pleasing to note the inclusion of modern knowledge about virus diseases in hardy fruits, for this information is especially welcome to those whose work it is to advise on such troubles. The book contains a great number of photographs of excellent quality, and the text is of the usual high standard. Considering that it now contains more pages as well as more photographs, it is astonishing that the price has increased by so little since the last edition nearly ten years ago. Among our reference books here is value for money and we take leave to extend our congratulations to Dr. Wormald and our thanks to the publishers.

D. E. GREEN

"One Hundred Indoor Plants." By A. C. Muller-Idzerda. 114 pp. Illus. (Blandford Press.) 10*s*. 6*d*.

Mrs. Vera Higgins has written a short but comprehensive introduction to the English edition of this attractive book. In a few pages she has skilfully dealt with the fundamental problems connected with the growing of indoor plants under the headings: containers, air, light, temperature, watering, soil and feeding. The main text consists of 100 pages, each one of which is devoted to one plant, including its photograph, Latin and vernacular names, a brief description and directions for its successful cultivation. Many of the selections are admirably suited to conditions in the average house in Great Britain, but others, such as bougainvillea, ixora, *Euphorbia fulgens* and *Anthurium scherzerianum*, are, at best, difficult even under rather special conditions

and in this country should be treated as greenhouse plants. Thus the reader must not be misled, for the book has been designed for other countries where almost universal central heating and more sunlight widen the scope of choice. The cultural directions are generally good, but in some places omit essential information, such as the number of weeks to allow when forcing lily-of-the-valley to bring them into bloom or the fact that camellias are lime-haters. The choice of plants is an interesting one with many fine selections, but I would like to see freesias and some of the fine fragrant rhododendrons such as 'Lady Alice' and 'Fragrantissimum' included and *Helleborus niger* and *Hosta japonica* left to their rightful place in the garden.

L. ROPER

"Artificial Lighting for Plant Growth." By A. E. Canham. (Reprinted from *Trans. Illum. Eng. Soc.*, XIX, No. 8, 1954.) 28 pp. Illus. Technical Report WT/31. (The Electrical Research Association.) 1*s.* 6*d.* net.

The use of artificial light for influencing the growth and behaviour of plants is becoming of greater and greater importance to growers and amateurs alike. The improvement of seedling growth in winter, the control of time of flowering of many plants, the forcing of bulbs in dark sheds, these are only a few of the ways in which artificial light is in regular use in horticultural production. There have been, and still are, however, many misconceptions with regard to the proper and economical use of the various light sources now available, and Mr. Canham, who has worked for several years on the problem, has given in inexpensive form a succinct, yet precise and detailed account of our present knowledge of the utilization of light in horticulture. The paper is a reprint of a lecture given to the Illuminating Engineering Society and includes some valuable points raised in the discussion. It is a publication which should have a wide demand.

R. H. STOUGHTON

"Pruning for Amateurs." By Raymond Bush. 143 pp. Illus. (Odhams Press, Modern Living Series.) 8*s.* 6*d.* net.

The amateur often goes wrong in pruning his fruit trees and bushes because he fails to understand the underlying principles. In this book Mr. Bush has set out these principles very clearly and describes and illustrates the different practices in some detail. Starting with suitable rootstocks, he deals with everything from formative pruning to the renovation of old trees. It would have been helpful if a table had been included showing the bearing habits of the different kinds of fruit, and if the author had enlarged on the regulated and renewal systems of pruning apples instead of referring the reader to another publication. However, this is a very useful book, which should be on every amateur fruit-grower's bookshelf.

J. M. S. POTTER

"Toxic Chemicals in Agriculture." (Risks to Wild Life.) 32 pp. (H.M.S.O.) 1*s.* 6*d.*

This pamphlet contains the report of a working party set up to consider precautionary measures which might be desirable in view of the toxic chemicals now used in Agriculture and Horticulture, and, in particular, the dangers which they may bring to the wild life, both plant and animal, of our countryside. Many of the problems considered, such as the effect on our flora of spraying the verges of roads with hormone weed-killers, are exceedingly complex, and clearly more experiments need to be made before any clear conclusions can be reached. The Committee, however, reached a number of interesting, although interim, conclusions which were not over-alarmist. They do, however, point to the need for care and consideration on the part of those using these extremely potent chemicals, especially DNC and the organo-phosphorus insecticides, and the report should be studied by all those who have occasion to use them extensively.

P. M. SYNGE

"Ben Lawers and its Alpine Flowers." 56 pp. Illus. (National Trust for Scotland.) 4*s.*

Ben Lawers has for long been well known among botanists for its fine alpine flora. In 1950 it was purchased by the National Trust for Scotland, who have produced this attractive and beautifully printed guide. The botany and plant ecology of the range are described by Dr. Duncan Poore of the Nature Conservancy, who suggests that

the schist of its geological formation is one of the most important factors in the richness of its alpine flora. There are also chapters dealing with the history and legends of the area, the geology, the animals, the prospects of winter ski-ing, and a good bibliography of books relating to the region. The black and white illustrations are exceptionally fine and are better than the colour ones.

P. M. SYNGE

"Snowdonia." (National Forest Park Guide.) 119 pp. Illus. (H.M.S.O.) 5*s*.

This guide contains chapters by various authorities on aspects of the geography, antiquities, natural history and forestry of the Snowdonia area. Like previous examples of this series it is both interesting, well illustrated and well produced, and certainly maintains the very high standard of these forest guides. In 1951 all this area was designated as a National Park. Snowdonia has provided interesting sites for experiments in the establishment of trees at higher altitudes, and the two most satisfactory have been found to be the Japanese Larch and the Sitka Spruce. Manuring experiments have also shown the value of a phosphatic manure when applied to the poorer types of peat land. The high rainfall undoubtedly contributed to the successful growth of the forests. An excellent map is included and the guide should be of considerable help and interest to all visitors to this area.

P. M. SYNGE

"Garden Lawns." By Stanley B. Whitehead. 96 pp. Illus. (London, W. & G. Foyle Ltd.) 2*s*. 6*d*. net.

The production and maintenance of good lawns is still one of the least understood aspects of gardening possibly because so many gardeners hold the view that grass "just grows." Although there are good books available for those who are really interested in lawns Dr. Whitehead's little book should receive a ready welcome and it is certainly good value for the modest price of half a crown. The author discusses in useful detail the very matters on which the amateur needs most guidance and gives a clear lead to many of the best practices. Such points of criticism as can be raised can nearly always be traced back to commendable abbreviation or to necessary simplification of some somewhat technical matters. The author acknowledges help from trade sources and it may be that a little bias is shown here and there but the text is essentially sound and useful. The lawn-makers' trade directory at the end is, however, decidedly abbreviated.

R. B. DAWSON

"Register of Chrysanthemums 1955." 80 pp. Illus. (E. T. Thistlethwaite, General Secretary and Editor, National Chrysanthemum Society, 83 Chesterfield Road, Barnet, Herts.)

One of the strongest recommendations of the recent international committee on nomenclature and registration was in favour of published registers of cultivar names in as many genera as possible. This register contains names of approximately 2,500 varieties which are still in cultivation. It includes also the name of the raiser, the year it was introduced, its classification and colour and gives also a series of excellent photographs illustrating the different classes. The thanks of all Chrysanthemum growers and raisers are due to Mr. E. T. Thistlethwaite and his Committee for the very considerable amount of work which must have gone into the compilation of this list.

P. M. SYNGE

"Die Marille (Aprikose) und ihre Kultur." By Löschnig, J. and Passecker, F. $9\frac{1}{2} \times 7$ in. 363 pp., 6 colour plates. Illus. Österreichischer Agrarverlag, Vienna, 1954. S. (Austrian) 136, or DM. 22.30.

We have here a monograph by experts on a crop which has received all too little attention. The cover is wide, yet important aspects are dealt with in detail. Löschnig was responsible for its original conception and for many sections, Passecker for other sections and final editing after the death of Löschnig, and L. Fulmek for a short, useful section on pests and diseases.

They deal in turn with: (1) general topics, such as botany and distribution of the apricot; (2) cultural aspects, including specification of environmental needs and the determination from indicator plants whether these are met, valuation of trees for insurance purposes; (3) fruit utilization, domestic and industrial; (4) variety descriptions, and (5) breeding and selection of varieties and rootstocks.

Part 4, which constitutes half the book, concerns the pomological classification and description of varieties in Europe (98), Central Asia (53), Manchuria and Siberia (6) and of the so-called cherry-plum group (8) which is formed by natural hybrids between *Armeniaca vulgaris* and *Prunus cerasifera*. This section includes pioneer work by Löschnig and is well supported by colour plates and line drawings. A special feature is the description of an ingeniously simple method of getting prints from cross sections of the stone and its lateral view for identification purposes.

This publication will be of great value in all regions where the apricot is or can be grown.

V. H. GOLDSCHMIDT

"Grapes under Glass." By H. Parsons. 62 pp. Illus. (W. H. & L. Collingridge, Ltd.) 10*s*. 6*d*.

This small book will be of great help to the present-day grape grower. Mr. Parsons' ability is well known and he has written from personal experience. The cultivation of the grape is clearly and simply given, and growers in doubt should easily find answers to their questions.

The zenith of grape growing in this country was probably in the ten years previous to the First World War. It was then the privilege of the writer to see some of the very fine exhibits that were staged in London, Shrewsbury and other provincial shows. There are now very few private gardens where grapes are grown really well. The few good exhibits shown to the public always claim admiration and are of very great credit to the growers.

It is to the many people today who are growing grapes with a minimum expenditure in fuel and labour that *Grapes under Glass* will prove very useful. Many more details could have been given to those who would aim to acquire the perfect finish to such difficult varieties as 'Canon Hall Muscat,' 'Muscat of Alexandria,' 'Madresfield Court,' and 'Mrs. Pince.' But Mr. Parsons has obtained the theme for which the book was written—practicability, and it will help to maintain the skill of grape growing which has deteriorated lamentably in recent years. It is for these reasons that I would highly recommend the book.

FRED J. ROSE

"The Wild Flowers of Kuwait and Bahrain." By Violet Dickson, M.B.E., F.Z.S. 144 pp. Illus. (Allen and Unwin.) 25*s*.

This book provides much varied information on the plant life of the Persian Gulf area. A list of the vascular plants of Kuwait and N.E. Arabia, with short field-notes and many drawings, two of which are in colour, forms a large part of the work. The vegetation is described and mapped; it consists of low-growing perennials intermixed with short-lived plants, which in a good year from autumn to April or May may cover the desert with green and flowers. Shorter accounts of larger fungi and of the marine algae are included. The botany of Bahrain is dealt with by Prof. R. O. Good. Mrs. Dickson writes with an extensive knowledge of Arabic names and usages of the grazing and horticulture. The gardens, planted under highly unfavourable conditions, produce mainly vegetables (mostly those familiar in Britain) and pot-herbs. They are sheltered from high winds and sand-storms by walls, as well as by tamarisk and other shrubs, and irrigated from wells. In some places slightly brackish water is a further difficulty. Wheat and barley are grown in the shelter of date palms. This book forms a handy and useful work for anyone concerned with the botany or horticulture of the area.

R. A. BLAKELOCK

"Commercial Fruits of India." By G. S. Cheema, S. S. Bhat and K. C. Naik. 8vo. 422 pp. Illus. (Macmillan.) 30*s*.

In view of the greatly increased interest in the dessert fruits of warm climates that is so evident all over the world this book appears at an appropriate time. In terms of actual production India is one of the great fruit-producing countries of the world, over three million tons of mangoes being produced annually in the United Provinces alone. The book is written by three authorities on fruit and fruit cultivation in India, who have been able to draw on a long period of practical and first-hand experience in writing this book.

The commercial fruit crops dealt with are the banana, mango, citrus fruits, guava, pomegranate, pawpaw or papaya, grape, sapodillo or chiko, fig, and jujube. Each monograph is most comprehensive and covers all aspects of cultivation and production

and includes a useful bibliography. There is no doubt that this book will be of value in other countries besides India, especially as detailed information on some of the fruits dealt with, such as the jujube, guava and chiko, is not available in most reference books on fruits. There are a few other fruits that India produces very well that one would have liked to have seen included, such as the litchi and perhaps the pineapple, now so important for canning in many countries, but these may not have been considered "commercial fruits" in India at the present time and hence their omission.

F. N. HOWES

"Rhododendrons en Azalea's." By H. J. Grootendorst. 8vo., 216 pp. (Vereniging voor Boskoopse Culturen, 1954.) 21*s*.

The author of this work is already well known to growers of rhododendrons in this country as President of the Association of Boskoop Growers. The Rhododendron Selection Committee of that association has, for something like fifteen years, conducted extensive trials of rhododendrons and all groups of azaleas, which are so prominently represented in nurseries in the Boskoop area. The main purpose of the trials has been to eliminate the poorer clones and to recommend the more meritorious for commercial propagation. As might have been expected, Mr. Grootendorst has produced a most comprehensive and valuable reference book.

The first part contains a botanical survey of the genus with descriptions of some of the more important species arranged in their series. There follows a review of the evolution of garden hybrids, grouped under the names of the species (e.g. *catawbiense*, *fortunei*, *griffithianum*, etc.) which have made the most notable contributions. This is a very valuable historical record, acknowledging the work of all the great raisers and naming many important hybrids. The detailed account of the development of the several groups of azaleas is of outstanding interest.

About seventy pages are devoted to lists of names of recommended clones of rhododendrons and azaleas, in Dutch, English and German, indicating their hardiness (in Holland), average flowering time and value for outdoor cultivation and forcing. In the Dutch lists the habit is shown, as are the names of the raisers.

N. K. GOULD

"Gardening without a Garden." By Charles Boff. 128 pp. Illus. (Odhams Press Ltd.) 7*s*. 6*d*.

This book is full of practical hints for the city-dweller as to how to make a success of plant culture in very limited space and unpromising surroundings. The detail is such as to ensure that even the most timid beginner can avoid the pitfalls which might discourage early effort. Line drawings show how to operate and attractive photographs what has been, and therefore what can be, accomplished. Pots, tubs, boxes, bowls, old sinks, empty fireplaces, ledges and hanging boxes are all dealt with and there are useful notes about suitable plants; also fascinating suggestions for growing miniature plants from seed. Little oaks, chestnuts and holly can easily be propagated, but Mr. Boff whets ambition by suggesting the purchase of seeds of cedars, Douglas fir, Japanese larch, etc. A cedar of Lebanon on the windowsill captures the imagination. We deprecate a chapter on the making of artificial flowers. Artfulness should have no place in a book whose object is to inspire a love and interest in living beauty. Rather we commend the growing of foliage plants and ferns for winter use, about which Mr. Boff has much to say which is useful.

H. G. NUSSEY

The following books have been received:

"Pine Sawflies." Leaflet No. 35. Forestry Commission. 8 pp. Illus. (H.M.S.O.) 9*d*.

"Tree Root Development on Upland Heaths." By C. W. Yeatman. Forestry Commission Bulletin No. 21. 72 pp. Illus. (H.M.S.O.) 10*s*. 6*d*.

"Onions and Related Crops." Ministry of Agriculture and Fisheries Bulletin 69. 30 pp. Illus. (H.M.S.O.) 2*s*.

"Diseases of Vegetables." By Lawrence Ogilvie. Ministry of Agriculture and Fisheries Bulletin No. 123. 80 pp. Illus. (H.M.S.O.) 4*s*.

"Cabbages, Brussels Sprouts." Ministry of Agriculture and Fisheries Bulletin No. 132. 32 pp. Illus. (H.M.S.O.) 2*s*.

"Mushroom Growing." Ministry of Agriculture and Fisheries Bulletin No. 34. 79 pp. Illus. (H.M.S.O.) 5*s*.

"Shrubs and Trees for your Garden." By Douglas Bartrum. 81 pp. Illus. (W. & G. Foyle Ltd.) 2*s*. 6*d*.

"The Forester's Companion." By N. D. G. James. 312 pp. (Basil Blackwell, 49 Broad Street, Oxford.) 12*s*. 6*d*.

"Miniature Flowers and Vases." By Anne Ashberry. 190 pp. Illus. (C. Arthur Pearson Ltd.) 15*s*.

"First Steps with Flowers." By Julia Clements. 72 pp. Illus. (C. Arthur Pearson Ltd.) 7*s*. 6*d*.

"Pruning." By Roy Genders. 88 pp. Illus. (W. & G. Foyle Ltd.) 2*s*. 6*d*.

"Photosynthesis." By Robert Hill & C. P. Whittingham. 165 pp. (Methuen & Co. Ltd.) 8*s*. 6*d*.

"Embryogenesis in Plants." By C. W. Wardlaw. 381 pp. (Methuen & Co. Ltd.) 42*s*.

"The Soils of the Glastonbury District of Somerset." Ministry of Agriculture and Fisheries. Sheet 296. 131 pp. Illus. (H.M.S.O.) 15*s*.

"Agriculture of the Sand Lands." Ministry of Agriculture and Fisheries Bulletin No. 163. 49 pp. (H.M.S.O.) 2*s*. 6*d*.

"The Volume-Basal Area Line. A Study in Forest Mensuration." Forestry Commission. Bulletin No. 24. By F. C. Hummel. 84 pp. (H.M.S.O.) 6*s*.

"Studies of North-West American Forests in relation to Silviculture in Great Britain." Forestry Commission Bulletin No. 25. 42 pp. Illus. (London: H.M.S.O.) 6*s*.

"Studies in Penstemon. No. 2.—Subgenus Dasanthera, The Shrubby Penstemons." 86 pp. (American Penstemon Society) $2.

"Journal of Experimental Botany." Volume 6, No. 17. 311 pp. (Oxford: At the Clarendon Press. London: Geoffrey Cumberlege.) 22*s*.

"Guide to the Flora of Malta." By Guido G. Lanfranco. 66 pp. of text. 300 line illustrations. (Progress Press Co. Ltd., Malta.) 6*s*. 6*d*.

"Journal of the National Institute of Agricultural Botany." Vol. VII No. 2. 1955. 240 pp. (Nat. Institute of Agric. Bot.) 10*s*.

"Book of Ferns." By Greta Stevenson. 160 pp. (Messrs. Wheldon & Wesley.) 12*s*. 6*d*.

"More Flower Schemes." By Constance Villiers-Stuart. 25 pp. Illus. (Jarrold & Sons Ltd., Norwich.)

"Rusts of British Forest Trees." By J. S. Murray. Forestry Commission Booklet No. 4. 14 pp. Illus. (H.M.S.O.) 2*s*. 6*d*.

"The Crossbill." Forestry Commission Leaflet No. 36. 11 pp. Illus. (H.M.S.O.) 9*d*.

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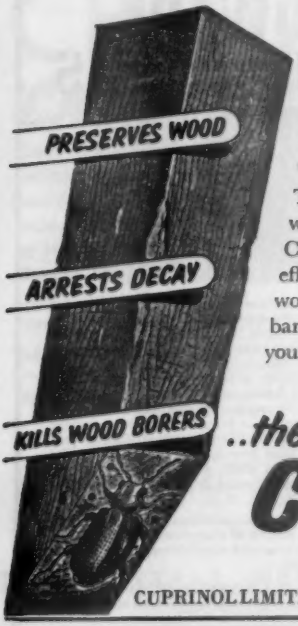

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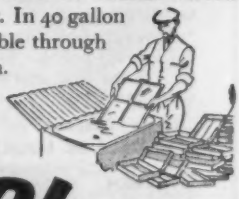

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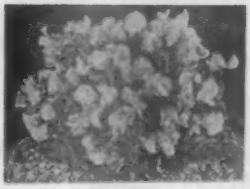

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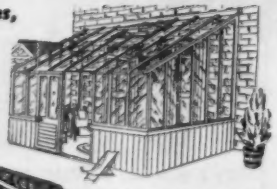

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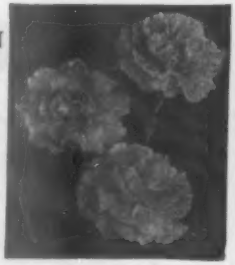

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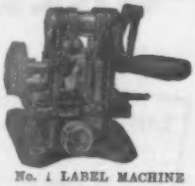

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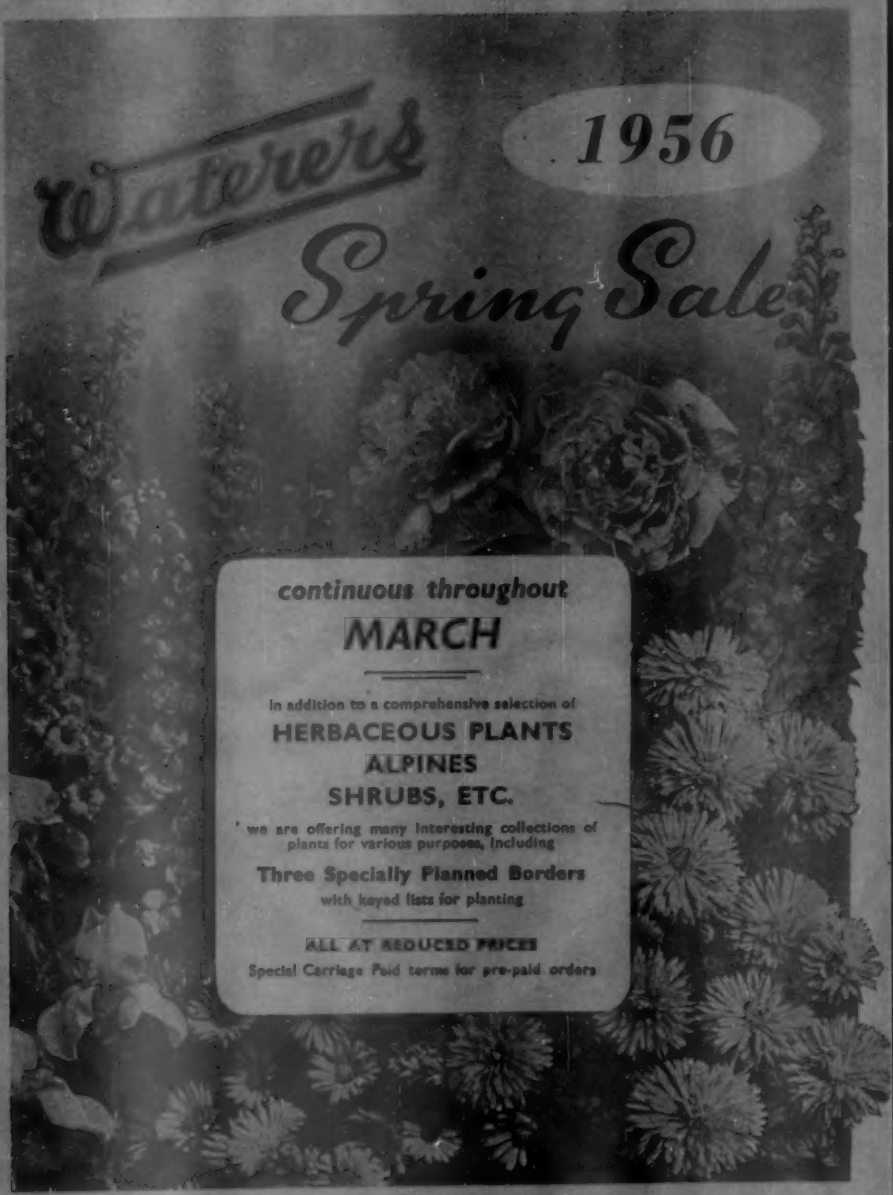

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